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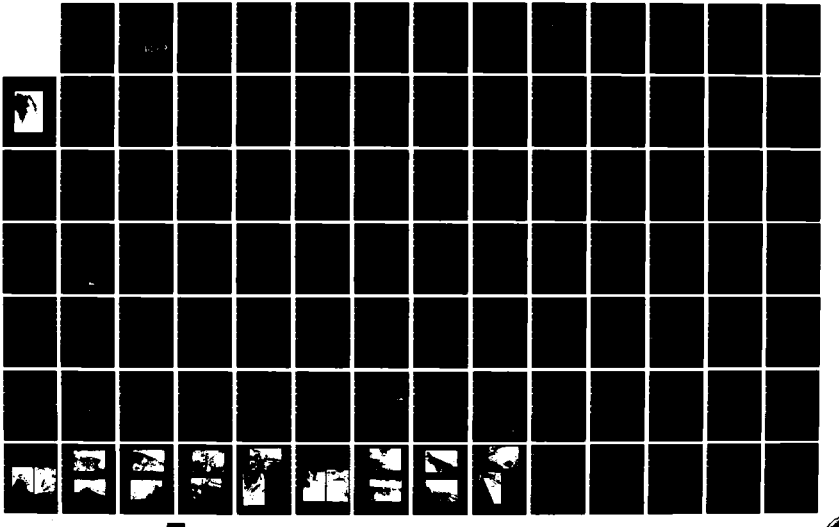

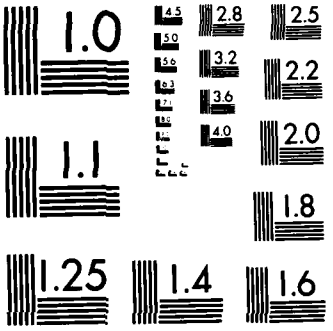

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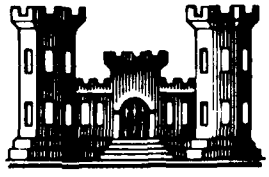
CONNECTICUT RIVER BASIN
BRADFORD, VERMONT

BLODGETT DAM
VT 00117

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Connecticut River Basin
Bradford, VT.
Roaring Brook

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is a zoned earthfill embankment about 29 ft. high and 714 ft. long. The dam is considered to be in fair condition. The dam is small in size with a significant hazard potential. There are a few recommendations and remedial measures which should be undertaken by the owner.

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REPLY TO
ATTENTION OF:
NEDED

MAR 06 1981

Honorable Richard A. Snelling
Governor of the State of Vermont
State Capitol
Montpelier, Vermont 05602

Dear Governor Snelling:

Inclosed is a copy of the Blodgett Dam (VT-00117) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Water Resources, the cooperating agency for the State of Vermont. In addition, a copy of the report has also been furnished the owner, Mr. Putnam W. Blodgett, Bradford, Vermont 05033.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Water Resources for your cooperation in carrying out this program.

Sincerely,

C. E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

BLODGETT DAM

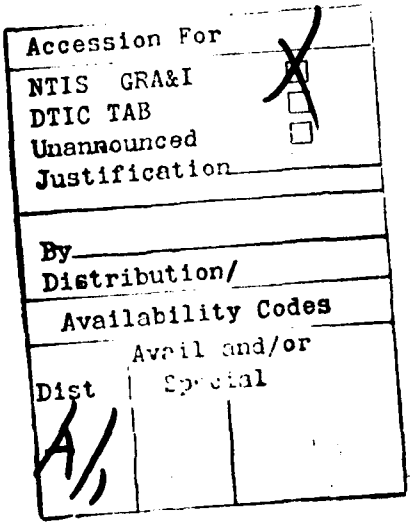
VT 00117

CONNECTICUT RIVER BASIN

BRADFORD, VERMONT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM



BRIEF ASSESSMENT

PHASE I INSPECTION REPORT

NATIONAL PROGRAM OF INSPECTION OF DAMS

Identification Number:	VT 00117
Name of Dam:	BLODGETT DAM
Town:	BRADFORD
County and State:	ORANGE COUNTY, VERMONT
Stream:	ROARING BROOK
Date of Inspection:	AUGUST 5, 1980

The dam, constructed in 1965, is a zoned earthfill embankment approximately 29 feet high and 714 feet long, including an 80 foot long overflow spillway founded in bedrock located to the left of the dam. The spillway contains a concrete crest wall, 15 feet of which is lower than the remaining 65 feet and constitutes the primary spillway. The right side of the downstream spillway channel is an earthen training wall protected by riprap. The upstream slope of the main dam is inclined at 3 horizontal to 1 vertical; the downstream slope is inclined at 2½ horizontal to 1 vertical and is equipped with a drainage system. The manually operated, gated low level outlet, located about 180 feet from the right abutment, is an 18 inch diameter corrugated metal pipe. The gate is reported to be operable.

The dam impounds a recreational pool in the lower watershed of Roaring Brook, and the discharge flows in an easterly direction approximately 3700 feet to its confluence with the Connecticut River. The impoundment is 1100 feet in length with a surface area of 14 acres. Normal storage capacity is 100 acre-feet.

Based upon the visual inspection and the review of available data regarding this facility, the dam is considered to be in FAIR condition. The considerable evidence of seepage noted downstream of the dam is not considered evidence of structural instability but should be monitored for changes in quality or quantity.

In accordance with the Corps of Engineers Guidelines and the size (SMALL) and hazard (SIGNIFICANT) of the dam, the Test Flood selected for use in the analysis was equivalent to the 100 year recurrence flood. Peak inflow to the impoundment is 1600 cfs; routed peak outflow from the dam 1470 cfs with the water elevation 4.2 feet over the spillway crest, or 6.8 feet below the top of the dam. The spillway capacity is 8950 cfs or 609% of the routed Test Flood outflow.

It is recommended that the owner retain a qualified registered engineer to design a seepage collection system that would permit measurement of the seepage observed at the downstream toe of the embankment, and to oversee removal of trees and root systems from the embankment and channel areas. This and remedial measures which are discussed in Section 7 should be instituted within one year of the owner's receipt of this report.

Stephen D. Murray, P.E.
Project Manager
James W. Sewall Company

STATE OF MAINE
STEPHEN
D.
MURRAY
2736
REGISTERED
PROFESSIONAL ENGINEER

This Phase I Inspection Report on Blodgett Dam (VT-00117) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH W. FINEGAN, JR., CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff"), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

TABLE OF CONTENTS

SECTION 5: EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL

The project is basically a low surcharge storage-nigh spillage earth embankment, constructed to impound water for recreational use only.

The tributary watershed consists of 3.70 square miles of relatively undeveloped terrain containing no significant storage other than the Blodgett Dam impoundment which, with a surface area of 14 acres, constitutes less than 1% of the total drainage area. With NGVD elevations ranging from about 650 feet to over 1,200 feet and an average slope of about 5%, the watershed topography is considered borderline between rolling and mountainous.

Blodgett Dam is a zoned earthfill structure equipped with a rock lined overflow spillway. The spillway will pass approximately 265% of the routed Test Flood outflow with the pool at the dam crest.

5.2 DESIGN DATA

Detailed SCS hydrologic/hydraulic design data were available and were utilized as applicable.

5.3 EXPERIENCE DATA

The maximum known flood at the dam site occurred June 30, 1973. Maximum water depth in the spillway was about 3 feet, or seven feet below the dam crest. This flow caused some minor erosion in the lower end of the downstream spillway channel.

5.4 TEST FLOOD ANALYSIS

The "Recommended Guidelines for Safety Inspection of Dams" presents a test flood range for significant hazard small size dams of the 100 year frequency to one-half the Probable Maximum Flood (PMF). Selection of the test flood to be utilized in the analysis of a particular dam is dependent upon the proximity of the dam to the upper or lower limits of its size category and upon the perceived risk of future failure. Due primarily to the former consideration, the test flood selected is equivalent to the 100 year frequency flood. The magnitude of this flood was estimated utilizing Weather Bureau projections of the ratio of the 100 year frequency precipitation to the probable maximum precipitation as presented in U.S. Department of Commerce T.P. #40 and applying that ratio to the PMF. The tributary wastershed consists of 3.70 square miles of moderately steep, essentially undeveloped terrain about 20% open and 80% wooded. Using a point midway between the curves for "rolling" and "mountainous" watersheds contained in the "Preliminary Guidance for Estimating Maximum Probable Discharge", dated March, 1978, peak inflow to Blodgett Dam impoundment is 1600 cfs. Routed Test Flood outflow, with the pool initially at normal level (el. 644 NGVD) is 1470 cfs with the spillway overtopped 4.2 feet, or 6.8 feet below top of dam. Based upon hydraulics computations, the capacity of the spillway is 8950 cfs, which is approximately 609% of the routed Test Flood outflow at the top of the dam.

SECTION 4: OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES

a. General - No formal operating procedure exists.

b. Warning System - No warning system exists.

4.2 MAINTENANCE PROCEDURES

a. General - The dam receives no regular maintenance. The crushed stone camp road crossing the spillway channel usually requires repair following the spring runoff.

b. Operating Facilities - The low level outlet gate is reported in good condition. No plan for the periodic maintenance of operating facilities is known to exist.

4.3 EVALUATION

The operation and maintenance procedures at this dam are inadequate to ensure that all problems encountered can be remedied within a reasonable period of time. The owner should establish a written operation and maintenance procedure as well as a warning system to follow in the event of an emergency at the dam.

3.2 EVALUATION

On the basis of the results of the visual inspection, Blodgett Pond Dam is judged to be in fair condition.

If the small trees on the upstream and downstream slopes are allowed to continue to grow, the resulting root systems could create seepage paths which could lead to internal erosion of the dam.

The outlet channel contains dense brush and fallen trees which could restrict the flow of water discharged from the outlet pipes.

The seepage areas observed beneath the outlet pipe are most likely not due to seepage through the embankment but a spring in the abutment. Seepage at the foundation drain is most likely exiting the toe drain shown in the drawings. The bedrock beneath the dam, as observed just downstream of the embankment, is horizontally jointed, and the joints are the most probable cause of the seepage viewed below the dam.

The eroded concrete spillway crest could incur further damage if not repaired.

c. Appurtenant Structures

Spillways

The primary and secondary spillways both occupy the same location at the left end of the dam. The primary spillway is established by a 15 foot by 1 foot notch formed in the concrete sill which forms the spillway crest. This concrete crest is eroded near its centerline as shown in Photo 1. Bedrock is exposed to the left of the spillway crest, also shown in Photo 1.

Outlet Structure

An 18" diameter low level outlet pipe passes through the dam and exits at the downstream toe of the dam at the contact with the right abutment as seen in Photo 6. The low level outlet is controlled by a slide gate housed in a steel well assembly on the upstream dam face as shown in Photo 12. The low level outlet appears in good condition and is reported operable.

d. Reservoir Area - There are no indications of instability along the banks of the reservoir in the vicinity of the dam.

e. Downstream Channel - There are two downstream channels, one downstream from the spillway and the other downstream from the pond drain and foundation drain outlets. The two downstream channels are referred to as the spillway channel and the outlet channel, respectively, in the following sections. The two channels join about 500 feet downstream of the dam.

The outlet channel contains dense brush and fallen trees, as shown in Photo 13. Trees were observed overhanging the channel.

The spillway channel is shown in Photo 14. The floor of the channel is covered with pieces of blasted bedrock and boulders and tall grass. A crushed-stone covered roadway crosses the channel about 250 feet downstream from the spillway crest. As shown in Photo 15 downstream from the roadway the floor of the spillway channel is covered with pieces of blasted bedrock, as shown in Photo 16. Erosion of the side of the spillway channel downstream from the roadway crossing is shown in Photo 17.

Further downstream, the natural brook channel is steep and the banks are wooded with heavy softwood growth. About 500 feet from the dam, the channel banks have been partially cleared of underbrush and there is a boys camp with the lowest structure about 15 feet above the brook channel. The next 2900 feet of brook channel between the boys camp and U.S. Route 5 is steep with undeveloped and wooded banks except in the vicinity of the road where there are four buildings, the lowest of which is about 19 feet above the stream. About 50 feet downstream of the highway bridge is a Boston and Maine railroad Bridge. As shown in Photo 18, this bridge backwall has a marker denoting the height of the November 4, 1927 flood.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General - At the time of inspection on August 5, 1980, the water level in the pond, impounded by the dam, was equal to the crest of the primary spillway with flow over the eroded center as shown in Photo 1. The weather was hot and humid. The general condition of this dam is fair.

b. Dam - The dam is an earth embankment with approximately 2.5H:1V downstream and 3H:1V upstream slopes. The dam consists of two sections separated by a knob of natural ground which is located between about Sta 5+00 and Sta 6+10. (The referenced station numbers were obtained from SCS Drawing No. 3 - "Blodgett Pond, Plan of Damsite," dated June, 1965.) The right section of the dam extends from about Sta 1+00 to Sta 5+00 and the left section is located between about Sta 6+10 and Sta 7+00. The top of the knob of natural ground has been removed down to the elevation of the dam crest.

An operating primary-secondary spillway is located to the left of the dam. A 10" thick, 25' long sill extension shown in Photo 2 forms the right abutment of the spillway with the left section of the dam. On the upstream slope of the right section of the dam is a gate structure which contains the controls for the pond drain. A 6 inch diameter outlet pipe from the foundation drainage system exits at the downstream toe of the right section of the dam about 10 feet left of the pond drain. The upstream slope of the dam is covered with tall grass, brush and some small trees as shown in Photo 3. No riprap was observed on the upstream slope above the waterline. Minor erosion has occurred on the upstream slope at the reservoir elevation as shown in Photo 3.

The crest of the dam is generally about 15 feet wide and has an unpaved roadway as shown in Photo 4. The crest is wider, on the downstream side, at the location of the natural knob. As shown in Photo 5, the downstream slope is covered with tall grass and brush and scattered small pine trees. Water was observed seeping from beneath the 18 inch diameter outlet pipe which exits at the downstream toe of the dam adjacent to the right abutment, seen in Photo 6. Clear seepage was observed downstream of the 6 inch diameter outlet pipe from the foundation drainage system as shown in Photo 7; a rust-colored pool of water, shown in Photo 8, was observed downstream from this seepage area. The SCS drawings for the Blodgett Dam indicate that a rock fill toe drain and blanket drain are located in the downstream toe of the dam at the location of the two seepage areas. The rock toe could not be discerned in the field.

Rust-colored seepage areas were also observed in the natural ground downstream of the downstream toe of the right section of the dam between the location of the 6 inch diameter outlet pipe and the natural knob as shown in Photo 9. The seepage areas are located about 125 feet downstream from the centerline of the crest of the dam. Photo 10, taken approximately 10 feet up the slope from the seepage area shown in Photo 9, shows seepage exiting the original ground at the base of a 10 inch diameter Birch. Another 10 feet up the slope, near the toe of the dam, evidence of animal burrows was noted as shown in Photo 11.

b. Adequacy - Detailed SCS hydrologic/hydraulic design data were available and with field measurements were utilized in conjunction with New England Division - Army Corps of Engineers "Preliminary Guidance for Estimating Maximum Probable Discharges" to perform the computations of outflow capacity.

The detailed engineering data required to perform an in-depth stability analysis of the dam was not available. The final assessment of the dam, therefore, must be based primarily on visual inspection, performance history, and spillway capacity computations.

c. Validity - A comparison of records, data, and visual observations reveals no significant discrepancies, other than those noted above, between design and as-built dimensions.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Available Data - Available data consists of six sheets by the Soil Conservation Service; Sheet 3 of 10 "Plan of Dam Site" June, 1965; Sheets 4 and 5 of 10 "Profiles" June, 1965, Sheet 6 of 10 "Drainage Details" June, 1965; Sheet 7 of 10 "Structural Details" June, 1965 and an unnumbered sheet "Construction Revision - Spillway" August, 1965. Also available was sheet 30 of a series of topographic maps prepared in 1957 at a scale of 1"=200' with a 5 foot contour interval.

b. Design Features - The drawings, computations and inspection reports indicate the design features stated in Section 1.

c. Design Data - Design data consists of information on the drawings as listed in "Available Data" and nine pages of design computations by the Soil Conservation Service prepared during late 1964 and early 1965.

2.2 CONSTRUCTION

a. Available Data - Information as contained in any plans, drawings, or specifications previously listed in "Design Data" or Appendix B.

b. Construction Considerations - Minor variations were noted in the dam as built compared to the design drawings. Sheet 3 indicates that a knoll or knob of natural ground would have projected above the crest of the dam for about 100 feet on the left center of the dam. The projection was removed and the typical dam cross section applies full length.

The concrete capped control section in the spillway was moved about 100 feet upstream in the spillway as shown in the Construction Revision plan of August, 1965.

The access road for the Challenge Wilderness Camp goes along the crest of the dam, turns right along the top of the training wall, runs down the side of the wall and across the spillway channel and continues on down to the camping area in the ravine below the dam.

2.3 OPERATION

Pond level readings are not taken on any regular schedule. No formal operation procedures are known to exist. The pond has been drained twice since 1965 in an attempt to eliminate trash fish which were competing with trout.

2.4 EVALUATION

a. Availability - Existing data was provided by the State of Vermont Agency of Environmental Conservation.

4.	Top Width:	14 ft
5.	Side Slopes:	3H to IV Upstream 2½H to IV Downstream
6.	Zoning:	2 Zones & drain
7.	Impervious Core:	to el. 645±
8.	Cutoff:	Trench
9.	Grout Curtain:	N/A
10.	Other:	N/A
h.	Diversion and Regulating Tunnel	N/A
i.	Spillway	
1.	Type:	Overflow
2.	Length of weir:	15 ft primary 65 ft secondary
3.	Crest el.	primary 644± secondary 645±
4.	Gates:	N/A
5.	Upstream channel:	N/A
6.	Downstream channel:	Rocklined channel
7.	General:	N/A
j.	Regulating Outlets	
1.	Invert:	630.75±
2.	Size:	18 inch diameter
3.	Description:	Corrugated Metal Pipe pond drain
4.	Control mechanism:	Slide gate
5.	Other:	N/A

5.	Full flood control pool:	N/A
6.	Spillway crest (Ungated):	644±
7.	Design surcharge (original design):	651.2±
8.	Top of dam:	655±
9.	Test flood surcharge:	648.2±

d. Reservoir

1.	Length of normal pool:	1100± ft
2.	Length of flood control pool:	N/A
3.	Length of spillway crest pool:	1100± ft
4.	Length of pool at top of dam:	1100± ft
5.	Length of test flood pool:	1100± ft

e. Storage

1.	Normal pool:	100 acre-ft
2.	Flood control pool:	N/A
3.	Spillway crest pool:	100 acre-ft
4.	Top of dam:	300 acre-ft
5.	Test flood pool:	160 acre-ft

f. Reservoir Surface

1.	Normal pool:	14 acres
2.	Flood control pool:	N/A
3.	Spillway crest:	14 acres
4.	Test flood pool:	17 acres
5.	Top of dam:	21 acres

g. Dam

1.	Type:	Zoned earthfill
2.	Length:	714± ft
3.	Height:	29± ft

i. Normal Operational Procedures - The gated low level outlet is reported operable and remains closed under normal operating conditions. There are no regular operational procedures other than occasional checking.

1.3 PERTINENT DATA

a. Drainage Area - 3.70 square miles of moderately steep, relatively undeveloped terrain which is 20% open and 80% wooded.

b. Discharge at Dam Site - Discharge is from over the primary and secondary spillways. Elevations are in feet referenced to NGVD datum.

1.	Outlet Works (conduits):	
	18" low level pond drain w/water at dam crest el. 655 (normally closed)	60 cfs
2.	Maximum known flood at dam site:	
	June 30, 1973. Magnitude estimated from data provided by owner:	750± cfs
3.	Ungated spillway capacity at top of dam el. 655 :	8950 cfs
4.	Ungated spillway capacity at test flood el. 648.2:	1470 cfs
5.	Gated spillway capacity at normal pool el. 644 :	N/A
6.	Gated spillway capacity at test flood el. 648.2:	N/A
7.	Total spillway capacity at test flood el. 648.2:	1470 cfs
8.	Total project discharge at top of dam el. 655 :	9010 cfs
9.	Total project discharge at test flood el. 648.2:	1530 cfs

c. Elevation (Feet, NGVD)

1.	Streambed at toe of dam:	626±
2.	Bottom of cutoff:	Unknown
3.	Maximum tailwater:	633±
4.	Recreation pool:	644±

The remainder of the crest wall is 1 foot higher. The spillway outflow channel is founded in bedrock with the left side a cut section, and the right side an earthen training wall. Both are protected with riprap.

To the immediate right of the spillway, a 100 foot section of natural earth, supplemented by cutoff trenches and a drainage system, is incorporated into and forms the left abutment of the main dam.

A gated 18 inch pond drain, with upstream invert at approximately 630.75, penetrates the main embankment at its approximate center.

Elevations are in feet referenced to NGVD datum.

No instrumentation exists at this dam.

c. Size Classification - SMALL - The dam impounds 300 acre-feet of water with the water at the top of the dam, which at elevation 655 is approximately 29 feet above the streambed elevation. Since the storage is between 50 and 1000 acre-feet and the height is between 25 and 40 feet, the dam is in the small category on the basis of both parameters and is thus classified as small in size according to the Recommended Guidelines.

d. Hazard Classification - SIGNIFICANT - If the dam were to be breached, there is potential for considerable downstream damage and the loss of a few lives. Approximately 500 feet downstream from the dam is a boys summer camp with lean-to type buildings about 15 feet above the streambed. The rapid 5 foot rise in stage from 7 to 12 feet would likely not damage the structures but could, under certain circumstances, catch personnel at lower elevations. Further downstream, about 3400 feet from the dam, U.S. Route 5 crosses about 16 feet above the streambed. The sudden 10 foot rise in stage here from 9 feet to 19 feet would inundate and probably destroy this bridge. About 3550 feet downstream from the dam the failure wave would overtop the Boston and Maine Railroad bridge by approximately 2 feet and damage or destroy it.

e. Ownership - Mr. Putnam W. Blodgett
Challenge Wilderness Camp
Bradford, Vermont 05033
(802) 649-1363

f. Operator - As above.

g. Purpose of Dam - Recreation.

h. Design and Construction History - The following information is believed to be accurate based upon plans and correspondence available and from conversations with the dam owner. The dam was designed in 1965 by the U.S. Department of Agriculture, Soil Conservation Service, and constructed by the owner during that same year. Except for some minor erosion repairs on the spillway outlet channel, there have been no post-construction changes.

PHASE I INSPECTION REPORT

BLODGETT DAM

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. James W. Sewall Company has been retained by the New England Division to inspect and report on selected dams in the State of Vermont. Authorization and notice to proceed were issued to James W. Sewall Company under a letter of April 2, 1980 from William E. Hodgson, Jr. Colonel, Corps of Engineers. Contract No. DACW 33-80-C-0051 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.

3. To update, verify and complete the National Inventory of Dams.

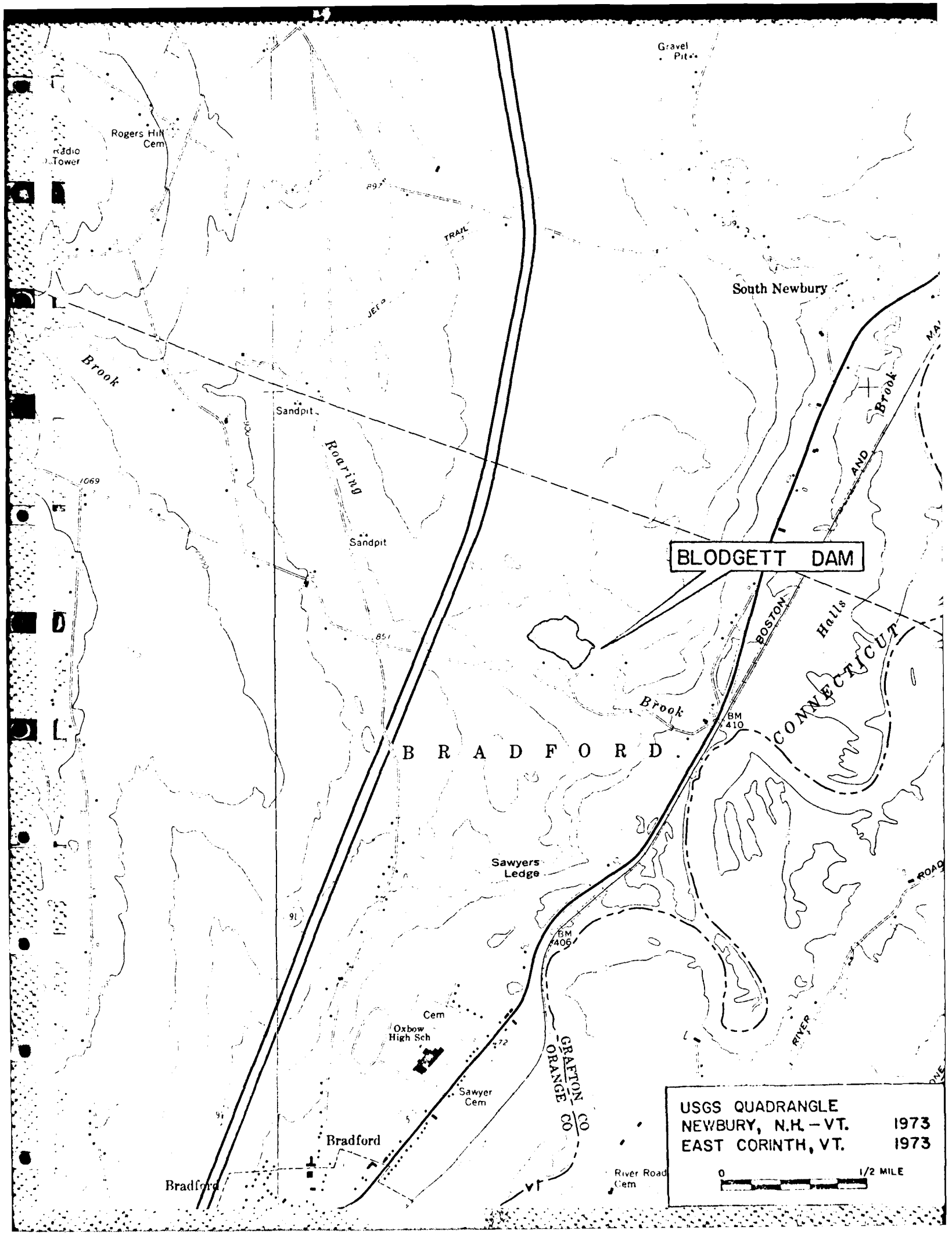
1.2 DESCRIPTION OF PROJECT

a. Location - The dam is located on the course of Roaring Brook about 3,700 feet upstream of its confluence with the Connecticut River, in the Town of Bradford, County of Orange, State of Vermont. The dam is shown on the Newbury, N.H.-Vt. 7.5 minute Quadrangle Map having coordinates N44° 01.7' and longitude W 72° 06.1'.

b. Description of Dam and Appurtenances - The dam, initially constructed in 1965, consists of a zoned eartnfill embankment having a total length of approximately 714 feet, including an overflow spillway founded in bedrock, located to the left of the dam.

The embankment has a top elevation of approximately 655, is 29 feet in height above the streambed and is 14 feet wide at the crest. The upstream slope is inclined at 3 horizontal to 1 vertical; the downstream slope is inclined at 2½ horizontal to 1 vertical and is equipped with a drainage system.

The primary spillway has a crest elevation of about 644 and is 15 feet long formed in the 80 foot long concrete crest wall of the rock spillway section.


Gravel Pit
Rogers Hill Cem
Radio Tower
TRAIL
JEEP
South Newbury
Brook
Sandpit
Roaring
Sandpit
BLODGETT DAM
BOSTON AND MAINE
Brook
Halls
CONNECTICUT
Brook
BM 410
B R A D F O R D
Sawyers Ledge
BM 406
ROAD
RIVER
Cem
Oxbow High Sch
Sawyer Cem
GRAFTON CO
ORANGE CO
Bradford
Bradford
River Road Cem
VT
USGS QUADRANGLE
NEWBURY, N.H.—VT. 1973
EAST CORINTH, VT. 1973
0
1/2 MILE

OVERVIEW PHOTO

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Blodgett Dam - VT 00117
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		Bradford, Vermont
		August 5, 1980

5.5 DAM FAILURE ANALYSIS

Utilizing the April, 1978, "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow would be 33,600 cfs with the pool initially at the top of the dam (655± NGVD). A breach of the dam would result in a rise of 5 feet in the water level of the stream at the initial impact area, a boys camp 500 feet downstream from the dam. This 5 foot rise in flood stage corresponds to an increase in flow of 24,650 cfs and an increase in the water level from a depth of 7 feet just before the breach, to a depth of 12 feet just after the breach. The rapid 5 foot increase in the water level would not likely damage the structures, the lowest of which is about 15 feet above the brook channel, but could potentially catch personnel unaware at lower elevations in the camping area. Further downstream, about 3400 feet from the dam, U. S. Route 5 crosses about 16 feet above the stream bed. The sudden 10 foot rise in stage here from 9 feet to 19 feet would innundate and probably destroy this bridge. About 3550 feet downstream from the dam the failure wave would overtop the Boston and Maine Railroad bridge by approximately 2 feet and damage or destroy it. Because of the potential for loss of a few lives in the initial impact area and the considerable downstream damage which would ensue from a breach, Blodgett Dam is classified as a "Significant Hazard" dam.

SECTION 6: EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATION

The visual inspection did not disclose any immediate stability problems. However, if the small trees on the upstream and downstream slopes continue to grow, the resulting root masses could lead to internal erosion of the dam. The dense brush and fallen trees in the outlet channel could restrict the flow of water discharged from the outlet pipes. The seepage areas observed at the downstream toe of the dam should be monitored. The concrete spillway crest could incur further damage if not repaired.

Erosion observed on the side of the downstream spillway channel is judged too remote from the dam to be of structural consequence.

6.2 DESIGN AND CONSTRUCTION DATA

The available data on the existing plans for the dam are inadequate for analyzing the stability of the dam.

6.3 POST-CONSTRUCTION CHANGES

There is no record of post-construction changes.

6.4 SEISMIC STABILITY

The dam is located in Seismic Zone 2, and in accordance with the recommended Phase I guidelines does not warrant seismic investigation.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition - Based upon the visual inspection, the dam is judged to be in fair condition.

b. Adequacy of Information - Due to the lack of adequate design and construction data for this dam, the assessment of safety is based solely on the visual inspection.

c. Urgency - The remedial measures and recommendations presented below should be implemented by the owner within 1 year after receipt of this Phase I Inspection Report.

7.2 RECOMMENDATIONS

The owner should retain a qualified registered engineer to design a seepage collection system that would permit measurement of the seepage observed at the downstream toe of the embankment and to supervise removal of trees and root systems as noted below and the backfilling of areas thus excavated with suitable material.

7.3 REMEDIAL MEASURES

a. The tall grass and brush growing on the dam slopes should be mowed and subsequent new growth cut regularly. The trees and bushes growing on the slopes and to a distance of 25 feet downstream should be removed and later new growth cut every two years.

b. The brush and fallen trees in the outlet channel should be removed. Trees overhanging the channel should also be removed.

c. The eroded concrete spillway crest should be repaired.

d. A formal annual inspection program by qualified engineers, with repairs as necessary, should be established by the owner.

e. A formal downstream warning system, to be implemented in the event of flood flow or imminent dam failure conditions, should be developed by the owner.

f. A formal program of operating and maintenance procedures, including exercising of the drain valve, should be instituted and fully documented to provide accurate records for future reference.

7.4 ALTERNATIVES

This study has identified no practical alternative to the above recommendations.

APPENDIX A

VISUAL CHECK LIST WITH COMMENTS

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT [illegible] DATE Aug. 5, 1980

TIME 9:30 A.M.

WEATHER [illegible]

W.S. ELEV. _____ U.S. _____ DN.S.

PARTY:

1. [illegible] 6. _____
2. [illegible] 7. _____
3. [illegible] 8. _____
4. [illegible] 9. _____
5. [illegible] 10. _____

PROJECT FEATURE	INSPECTED BY	REMARKS
1. Dam Embankment	D.P.L. S.L.H. S.D.M. R.L.T. C.A.H.	
2. Outlet Channel	D.P.L. S.L.H. S.D.M. R.L.T. C.A.H.	
3. Service Spillway & Discharge Channel	D.P.L. S.L.H. S.D.M. R.L.T. C.A.H.	
4.		
5.		
6.		
7.		
8.		
9.		
10.		

2.

PROJECT [illegible] DATE [illegible]

PROJECT FEATURE Dam Embankment NAME [illegible]

DISCIPLINE [illegible] NAME [illegible]

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	655 MSL
Current Pool Elevation	644 MSL
Maximum Impoundment to Date	N.A.
Surface Cracks	None observed
Pavement Condition	No pavement on crest.
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	No misalignment observed
Horizontal Alignment	No misalignment observed
Condition at Abutment and at Concrete Structures	Some seepage observed along junction of downstream slope and right abutment.
Indications of Movement of Structural Items on Slopes	None observed
Trespassing on Slopes	Crest is unpaved roadway used for vehicular traffic.
Sloughing or Erosion of Slopes or Abutments	Minor erosion on upstream slope at present water level.
Rock Slope Protection - Riprap Failures	No riprap observed on upstream slope
Unusual Movement or Cracking at or Near Toe	None observed
Unusual Embankment or Downstream Seepage	Seepage exiting from base of 18 in. outlet pipe and from native ground downstream of downstream toe.
Piping or Boils	None observed
Foundation Drainage Features	Outlet pipe from downstream toe
Toe Drains	None observed
Instrumentation System	None observed
Vegetation	Dense brush on upstream slope, trees on downstream slope.

PERIODIC INSPECTION CHECKLIST

PROJECT _____ DATE _____

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	There is no dike on this project
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	
Rock Slope Protection - Riprap Failures	
Unusual Movement or Cracking at or Near Toes	
Unusual Embankment or Downstream Seepage	
Piping or Boils	
Foundation Drainage Features	
Toe Drains	
Instrumentation System	
Vegetation	

PROJECT _____ DATE _____

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	Not observed - Under water
a. Approach Channel	
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECKLIST

PROJECT Bluestone Dam — DATE

PROJECT FEATURE — NAME

DISCIPLINE — NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	There is no control Tower
a. Concrete and Structural	
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

6

PERIODIC INSPECTION CHECKLIST

PROJECT _____ DATE _____

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK

PROJECT _____ DATE _____

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	None observed
Channel	
Loose Rock or Trees Overhanging Channel	some trees overhanging channel
Condition of Discharge Channel	Brush growing in channel, cobble and boulders in channel.

PERIODIC INSPECTION CHECKLIST

PROJECT [illegible] Dam — DATE [illegible]

PROJECT FEATURE [illegible] — NAME [illegible]

DISCIPLINE [illegible] — NAME [illegible]

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	None observed
Floor of Approach Channel	Loose soiled
b. Weir and Training Walls	The spillway crest is formed by a concrete cap on existing leave.
General Condition of Concrete	This concrete is eroded near its centerline
Rust or Staining	
Spalling	
Any Visible Reinforcing	No
Any Seepage or Efflorescence	None observed
Drain Holes	None observed
c. Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	Some trees overhanging channel.
Floor of Channel	Covered with loose and pieces of blasted rock.
Other Obstructions	Crushed stone soiled road crosses spillway channel about 250' downstream of spillway crest

PERIODIC INSPECTION CHECK LIST

PROJECT _____ DATE _____

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	There is no service bridge
a. Super Structure	
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Underside of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

ENGINEERING DATA

VI. General Comments

Dam is in overall good condition but shows lack of maintenance. Drainage system and seepage should be further investigated.

Report By A. Peter Borrancorb Date 10-23-79

A. Peter Borrancorb. PE
Dam Safety Engineer

Attachments:

① Photos when developed

② Copy of SCS plans (1965) showing general area of seepage.

Note: The writer did not have this plan with him during the inspection so notations are approximate

Copy to Dick Gallo SCS 10/25/79 a.m.

2. Other Gates, Drains, Appurtenances Access pipe 51"x34" vertical riser on u/s wl had covered on. Did not inspect. ~~Inspection~~ Possibly some infiltration into pond drain because of rust color water/sediments (?)

3. Remarks

IV. Operation and Maintenance

Apparently no brush has been cut since last inspected (10/4/76).

V. Inspection Summary

A. Information Obtained

1. Photographs ✓
2. Dimensions
3. Other

B. Additional Information Needed

Investigate trench drain & seepage.

C. Overall Condition of Dam

Good but needs maintenance.

10. Stop Logs, Flash Boards None

11. Remarks OK but vegetation may become a problem if left too long.

B. Emergency Spillway

Type see "A" above

Controlled or Uncontrolled

1. Approach Channel

2. Transition

3. Control Section

4. Discharge Channel

5. Remarks

C. Drawdown Facilities, Gates, Drains, Appurtenances, Etc.

1. Drawdown Facility 18" yard drain

Condition Outlet only visible. Seepage (rust colored) exiting end of pipe. Some sediments (") - rust colored. Flowing water (5-10 gpm) exiting from stone fill under pipe from general area of blanket drain.

10. Alignment OK

11. Remarks Good condition

III. Condition of Outlet Works

A. Principal Spillway and Emergency Spillway (Combined)

Type Earth, rock cut, concrete control section, training dike right side

Controlled or Uncontrolled uncontrolled

1. Approach Channel clear

2. Transition clear

3. Control Section clear

4. Discharge Channel Tall grass + brush, 3 pine trees along right side clear of debris.

5. Intake Structure N/A

6. Conduit N/A

7. Outlet Structure N/A

8. Trash Racks N/A

9. Anti-vortex Devices N/A

14. Alignment OK

15. Movement none apparent

16. Remarks Embankment stable but brush growing up. Apparently drainage system (trench drain) is plugged and seepage is being forced out at along toe of old ground near old brook bed.

C. Crest

1. Vegetative Cover grass cover — OK except in wheel tracks

2. Erosion none significant

3. Evidence of Overtopping none

4. Settlement, Cracks none observed

5. Animal Burrows none observed

6. Debris none

7. Use of crest (road, trail, etc.) Crest provides vehicular access — no grass in wheel tracks

8. Structural OK

9. Abutments OK

B. Downstream Face or Slope and Toe

1. Vegetative Cover Grass cover being taken over by brush. A few small pines.

2. Erosion none observed

3. Slumps, Slides, Cracks none observed

4. Animal Burrows a few ~ rat size

5. Slope Protection Vegetated

6. Debris none

7. Seepage (flowing water – rust colored) Significant, all along toe of slope (old ground) between Stations 3+0 → 5+0. Seepage has pooled in low area and flowing in old brook bed. No active seepage on embankment but "wet type" vegetation observed 1/3-1/2 way up slope in swampy areas.

8. Piping Possible along entire toe (old ground) and possibly some near toe of embankment near pond drain and toe drain.

9. Boils None apparent.

10. Toe Drains 6" CGMP to left of 18" pond drain was dry but seepage existing below and around it.

11. Scour none

12. Structural slope is firm, appears stable

13. Abutments right contact damp

II. Condition of Main Structure

Type of Construction Zoned E/F

A. Upstream Face or Slope

1. Vegetative Cover Grass cover being taken over by brush and small (3-9') evergreens (mostly white pine)
2. Erosion none observed
3. Slumps, Slides, Cracks none observed
4. Animal Burrows none observed
5. Slope Protection vegetated +
6. Debris none
7. Structural stable
8. Abutments OK
9. Alignment OK
10. Movement none apparent
11. Remarks Good condition except for brush & trees.

State of Vermont
Agency of Environmental Conservation
Department of Water Resources
Montpelier, VT 05602

DAM INSPECTION REPORT

Name BLODGETT DWR No. 24-2

Town Bradford NDS No. VT00117

Owner Putnam W. Blodgett Inspection Date 10-22-79

Address Bradford, Vt. 05033 Last Inspected 10-4-76

Telephone _____ Hazard Class 3 check (SCS is')

Size Category III

PERSONS PRESENT AT INSPECTION (Name and Organization):

Inspecting Party A.P. Barranco, Jr. - Dept of Water Resources

Others _____

I. General Conditions at Time of Inspection

Weather Clear, hot (80°+) Ground Conditions Dry

Water Surface Elevation -0.05' Datum low flow section (conc.)

Accessibility fully accessible

Reservoir Area clear

Remarks Stopped at Blodgett house and spoke with Mr. Blodgett's mother. Got permission to inspect dam.

GENERAL		
TO	NOTED	DATE
DJM	DJM	11/24/76
DHS	DHS	11-24-76
AJR		

MANAGEMENT & ENGINEERING DIVISION

802/828-2393

November 23, 1976

Mr. Putnam W. Blodgett
Bradford, VT 05033

Subject: Blodgett Dam - Bradford

Dear Mr. Blodgett:

Thank you for allowing engineers of this Division to make a visual inspection of your dam, and for visiting our office on October 18 concerning their findings.

As you are aware, no signs of stress or deterioration were found during the inspection. There was no seepage noted except at the toe drains. Overall, the embankment seemed to be in stable condition and structurally sound. The spillway was also found to be in good condition and apparently functioning well.

It was noted though, some maintenance is needed. This is generally limited to brush and tree cutting on the dam and mowing the grass cover. Similar work is needed in the spillway area. We generally encourage this activity to maintain the protective plant cover. Mowing prevents the growth of woody plants and helps develop a cover and root system more resistant to runoff.

If we may be of further assistance, or should you have additional questions, please feel free to contact Donald H. Spies, Dam Construction Engineer, at this office.

Sincerely yours,

Andre J. Rouleau
Assistant Director

DJM/vl

VERMONT DEPARTMENT OF WATER RESOURCES

INFORMATION SHEET

Name of Dam Bladgett Town Bradford

Owner Putnam Bladgett Name of Stream Roaring Brook

Address Bradford Vermont 05033 Classification III ?

U.S.G.S. Coordinates: Lat. 44° 01' 40" Long. 72° 6' 5"

U.S.G.S. Map Woodsville N.H. Aerial Photos VT-62-H 43-103 to 104

U.S.G.S. Elev. @ Spillway

Total Length of Dam 565 ft. Crest Width of Emergency Spillway 45 ft.

Width of Top 14 ft. Maximum Height 22.4 ft

Spillway Capacity: Principal 525 cfs * Emergency 4325 cfs @ DHW

Pond Area 144 A @ NWL 130 A @ DHWL Drainage Area 4.85 Sq. Mi.

Pond Volume: Normal Water Level 986 AF Design High Water Level 2185 AF

Maximum Water Depth: Normal Water Level 17 ft. Design High Water Level 24.2 ft.

Storage Before Emergency Spillway is Used 14.4 AF

Use of Reservoir Recreation

Description of Dam: Zoned earth fill with 3 on 1 upstream slope and 2½ on 1 downstream slope.

Description of Spillway(s): P.S. - 1 ft notch 15 ft wide in C.S.
E.S. - Concrete weir [illegible] 1½ to 1 slope, [illegible]

Designed by SCS Year Built 1965

Hearing Date June 25, 1965 Order Date August 24 1965

Additional Remarks: * for 1 ft depth of water 1 c 285 cfs
2.85 10-27

SUMMARY OF DATA AND CORRESPONDENCE

BLODGETT DAM

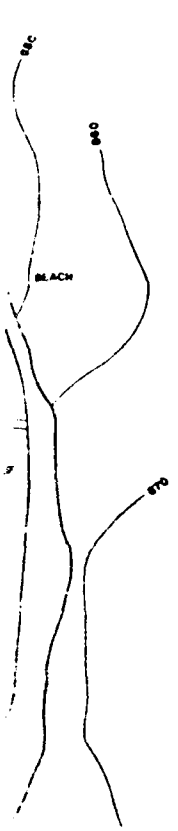
EXISTING PLANS

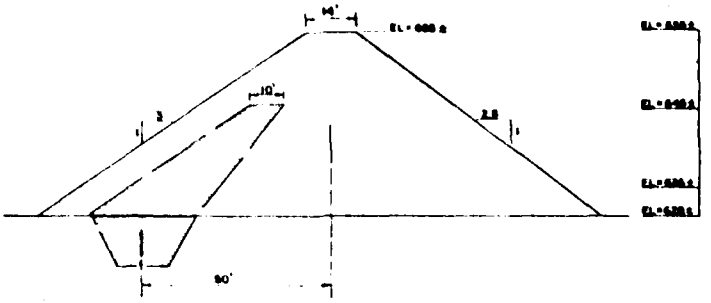
On file with the Vermont Department of Water Resources:

1. U. S. Department of Agriculture
   Soil Conservation Service
   Blodgett Pond
   Bradford, Vermont
   Sheet 3 of 10 - Plan of Dam Site, June, 1965
   Sheet 4 of 10 - Profiles, June, 1965
   Sheet 5 of 10 - Profiles, June, 1965
   Sheet 6 of 10 - Drainage Details, June, 1965
   Sheet 7 of 10 - Structural Details, June, 1965
   Unnumbered Sheet Construction Revision - Spillway August, 1965

2. Vermont Department of Highways
   Sheet 30 of a series of topographic maps prepared in 1957 at a scale of 1"=200' with a 5 foot contour interval. This covers the site of Blodgett Dam.

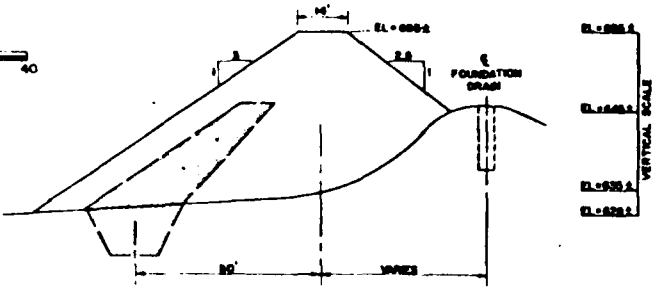
REPRODUCED AT GOVERNMENT EXPENSE





SECTION A-A

20 0 FEET 20 40



SECTION B-B

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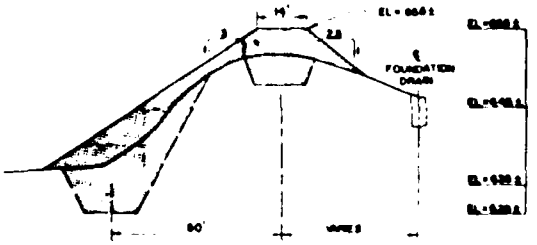

SECTION C-C

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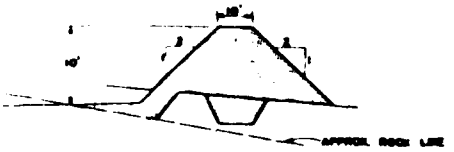


FINE GRAINED SILTY CLAY MATERIAL

TYPICAL SECTION OF TRAINING WALL

20 0 FEET 20 40

NOTE THIS PLAN COMPILED FROM EXISTING PLANS FOR DAM CONSTRUCTION IN 1968, AS SHOWN BY U.S.D.A. SOIL CONSERVATION SERVICE IN MAY, 1965, AND MODIFIED AS OBSERVED IN THE FIELD.

10 FT. CONTOURS (NGVD) ARE FROM PRE-CONSTRUCTION SURVEY INFORMATION AND ARE APPROXIMATE.

U. S. ARMY ENGINEER DIV NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

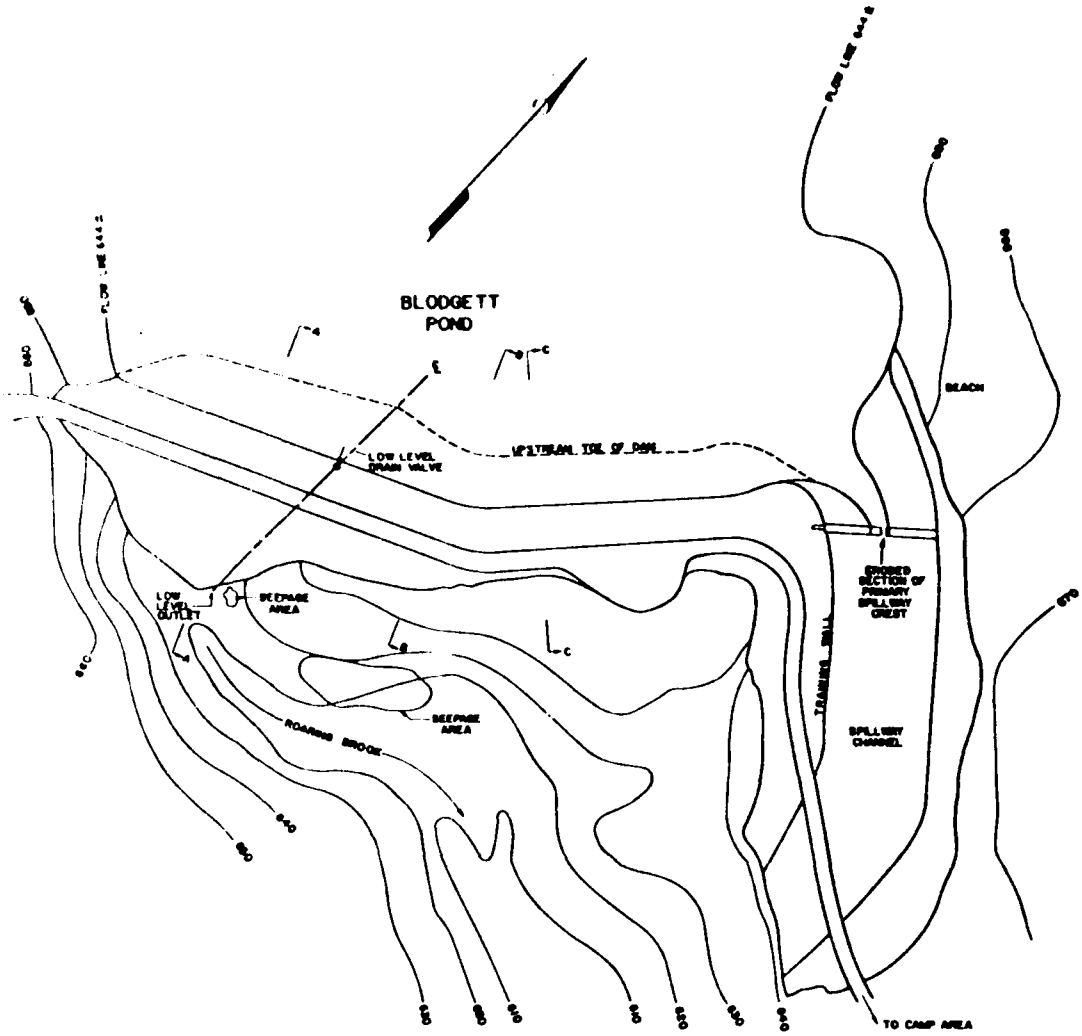
JAMES W. SEWALL COMPANY
CONSULTING ENGINEERS

NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS

BLODGETT DAM
BRADFORD, VT

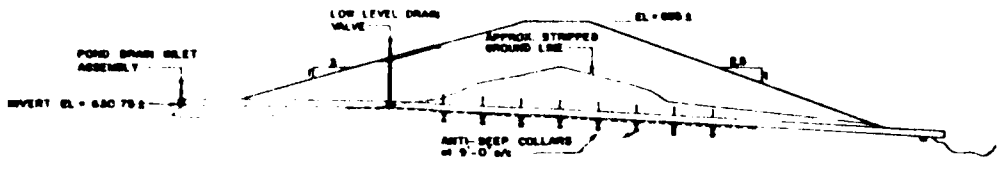
NO.	REVISION	DATE	BY

Design | Check | Date | SHEET OF
Drawn | Approved



PLAN

60 0 FEET 60 120



PROFILE ALONG ℄ OF POND DRAIN

20 0 FEET 20 40

FILE COPY

ORIGINAL
TO | DATE
DEC
OAR
DNS
1/7/74
FILE

MANAGEMENT & ENGINEERING DIVISION
January 4,1974

Mr. Putnam W. Blodgett
Bradford
Vermont 05033

Dear Mr. Blodgett:

We appreciate your prompt reply to our letter of December 18,1973, relative to the draining and de-silting of your pond.

We recognize that if the work was carried out as noted, sediment transportation down Roaring Brook was minimized. However, on the basis of the present information, it is our opinion the work was a de-silting operation. In your future operation and maintenance of the dam, we would caution you to refrain from performing this type of work without notifying and seeking approval of the Board as noted in the Order.

We will plan to have our dam construction engineer review your project along with his routine inspections this year.

Very truly yours,

John E. Cerutti, Director
Management & Engineering Division

JEC/DJM/jcd
cc: C. Bothwell, Water Resources Board

Putnam W. Blodgett

CHALLENGE WILDERNESS CAMP / BRADFORD, VERMONT 05033

December 26, 1973

TO	NOTED	DATE
Sec-		
AJR		1/3/74
DJH		1/4/74
DHS		1-3-74

SPEND TO

Mr. John E. Cerutti, Director
Management & Engineering Division
Agency of Environmental Conservation
Montpelier, Vermont 05602

Dear Mr. Cerutti:

This is in reply to your letter of December 18 inquiring about the draining and 'de-siltation' of my pond.

The pond was drained for two reasons: 1) to try to reclaim the pond from the trash fish that were destroying the trout, and 2) to remove part of the delta that had built up at the inlet due to the natural inflow, the construction of I-91 upstream, and this year's June 30 flood.

The SCS dozer pushed the material up on the bank above waterlevel.

As this work took place after the pond had been drained and was out of the streambed and as the pond drain is above the pond bottom no sediment went down Roaring Brook.

Therefore, I did not consider that any 'de-siltation' would or did take place.

Sincerely yours,

Putnam W. Blodgett

Putnam W. Blodgett

FILE COPY

ROUTING

GENERAL		
TO	NOTED	DA...
JHS	DHS	12-18-73
DJM	DJM	12/18/73
OGR	—	12/19
JEC	JEC	
SUSPEND TO		
FILE		

MANAGEMENT & ENGINEERING DIVISION

December 18, 1973

Mr. Putnam W. Blodgett
Bradford
Vermont 05033

Dear Mr. Blodgett:

We have been informed you recently drained and de-silted your pond on Roaring Brook in Bradford. We wish to remind you Condition No. 10 of the Order Approving and Authorizing the Construction of a Dam issued August 24, 1965, reads, "There shall be no de-silting, so-called, with respect to the operation and maintenance of said dam except upon the prior written approval of the Board and on such terms and conditions as it shall specify."

We therefore request you please provide an explanation of how and why this occurred.

Sincerely yours,

John E. Cerutti, Director
Management & Engineering Division

JEC/DHS/kmp

cc: Cathy Bothwell, Water Resources Board

DEPARTMENT OF WATER RESOURCES
MONTPELIER, VERMONT

OFFICE MEMORANDUM

DATE November 4, 1965

TO: For the Record

FROM: Donald W. Webster

SUBJECT: Blodgett Dam, Bradford

On November 3, 1965, the writer and John E. Cerutti inspected the dam at the Blodgett family camping area on Roaring Brook in the Town of Bradford. The impoundment section on the dam is complete and water has been impounded in the dam to within four feet of design normal water level. The spillway crest (concrete) has been completed, and with the exception of shaping up the spillway outlet channel downstream of the crest, which the contractor was doing on this date, the dam is substantially completed in accordance with plans and specifications on file in this office.

ROUTING		
GENERAL		
TO	NOTED	DATE
DWW	DWW	11-5
JEC.	JEC	11-5
RWT	JE.	11-5
SUSPEND TO		
FILE		

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

19 Church Street
Burlington, Vermont
August 17, 1965

Mr. John E. Cerutti, Hydraulic Engineer
Department of Water Resources
State Office Building
Montpelier, Vermont

Dear John:

Enclosed you will find plans for proposed spillway revision on the Blodgett RC&D dam.

In the event any part of this does not meet with your approval we would appreciate being advised at your earliest convenience.

The requirements of your department for the compaction of the earth fill in the upper part of the dam have been met. Spillway rock excavation is about complete and I expect concrete work will be started soon.

Very truly yours,

Kenneth P. Wilson
State Conservation Engineer

cc: P. Blodgett
J. Bryant

Enclosure

ROUTING		
GENERAL		
TO	NOTED	DATE
JEC	JC	8-23
SUSPEND TO		
FILE		

(1)

GEOLOGY REPORT
White River RC&D Project
Blodgett Pond,
Bradford, Vermont

Prepared by:

John H. Bryant, Design Engineer
Louis Dondero, Soil Scientist

Date: 12-21-64

A. General

Dates of Exploration: 8/7/64, 9/3/64 - Louis Dondero
John H. Bryant

Location: Town of Bradford, Orange County, Vermont

Structure Class: "b"

Equipment Used: Massey-Ferguson MF 185 Backhoe

Site Data:

Drainage Area: 4.85 sq. miles, 3100 acres
Maximum Pool Depth: 22 feet
Purpose: Recreation
Maximum Height of Dam: 32.5 feet
Top Length of Dam: 345 feet
Emergency Spillway: Vegetated
Principal Spillway: Concrete Weir
Volume of Fill: 16,000 cubic yards

Methods of Exploration:

Backhoe, Hand Auger, Seismic

B. Surface Geology and Physiography

Connecticut River Valley modified by glacio fluvial and glacial lacustrine deposits to an elevation of 600± feet. At elevations above 600± feet the area is mainly glacial till and outcrops of bedrock. The bedrock occurs at lesser elevations in streambeds and deep erosion cuts.

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ASSISTING SOIL AND WATER CONSERVATION DISTRICT	DRAWING NUMBER SHEET____ OF____ DATE____

VT-57 3/3/64 USDA-SCS

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO 1958 O-870068

STATE		PROJECT			
VERMONT		BLODGETT POND			
BY	DATE	CHECKED BY	DATE	JOB NO.	
J.H.C.	2-2-65	F.M.W.	3-23-65		

SUBJECT CRITERIA & STRUCTURE CLASSIFICATION SHEET ___ OF ___

Design Criteria

CLASS 'B' STRUCTURE - S.C.S. E.M. 27

(SCS) PRINCIPAL SPILLWAY STORM - 6 HR - 50YR (MC II)

(SCS) FREQUENCY OF OPERATION OF EMERGENCY SPILLWAY - 2%

(SCS) EMERGENCY SPILLWAY STORM - 1.25 x MIN. E.W.P. REC. (MC II)

(SCS) FREEBOARD - 1.25 x MIN. E.W.P. REC. (MC II)

(VT W.R. DEPT) ANTI-SEEP COLLARS - 125% INCREASE FROM TOE TO DRAIN

Structure Classification Computations

HEIGHT 30.9'
STORAGE 298.5 A.F.
POP. DAMAGE CENTER 0
FLOOD PLAIN WIDTH 150'
DISTANCE TO DAMAGE CENTER 0.35 MI

$H \times S = 8.405$

$K_s = 7.3$ $K_R = 1$ $K_W = 7.6$ $K_d = 0.55$

$$K = \frac{K_s + K_R + K_W}{K_d} = \frac{7.3 + 7.6 + 1}{0.55} = \frac{15}{0.55} = 27.3$$

This recreation dam is located in the Township of Bradford, Vermont.

A summary of pertinent design information is given on sheet 2 of this report.

Criteria and procedures used in this design are given in the following Soil Conservation Service publications:

National Engineering Memorandum No. 27, Limiting Criteria for the Design of Earth Dams
National Engineering Memorandum No. 42, Reinforced Concrete Pipe Drop Inlet Barrels
National Engineering Memorandum No. 50, Drop Inlet Spillway Standards
National Engineering Handbook No. 4A, Hydrology
National Engineering Handbook No. 5, Hydraulics
National Engineering Handbook No. 8, Geology
Engineering Division Technical Release No. 2, Earth Spillways

The results of hydrologic and hydraulic computations are given on sheet 3 of this report.

This structure consists of a compacted earth fill with a cutoff extending down into the foundation. A drainage system is installed to control seepage through the embankment and foundation.

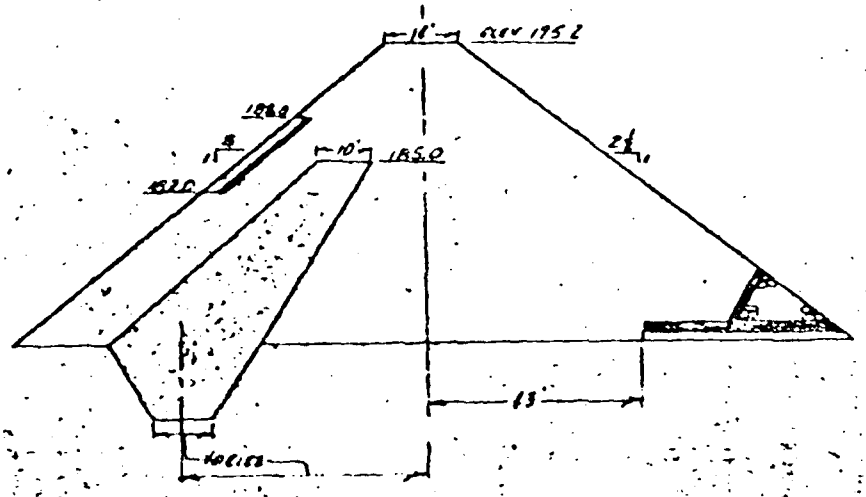
The principal spillway is a weir section located in the emergency spillway.

The emergency spillway is designed as a rock cut in the left abutment.

U S DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

DESIGN REPORT SUMMARY

I.	Watershed data	
	A. Structure class	(b)
	B. Drainage area	3,100 Ac.
	C. Time of concentration - T_c	1.77 Hrs.
	D. Hydrologic curve number - C_n	
	1. Moisture condition II	64
	2. Moisture condition III	82
II.	Principal spillway	
	A. Weir size	1 x 15 Ft.
	B. Pond drain size	18 In.
III.	Emergency spillway	
	A. Width	80 Ft.
	B. Side slopes	1-1/2 and 2:1
	C. Exit slope	0.0167 Ft/Ft.
	D. Maximum velocity at control section (D.H.W.)	11.1 Ft/Sec.
IV.	Earth fill	
	A. Height	32 Ft.
	B. Volume	22,000 C. Y.
	C. Compaction	Class A

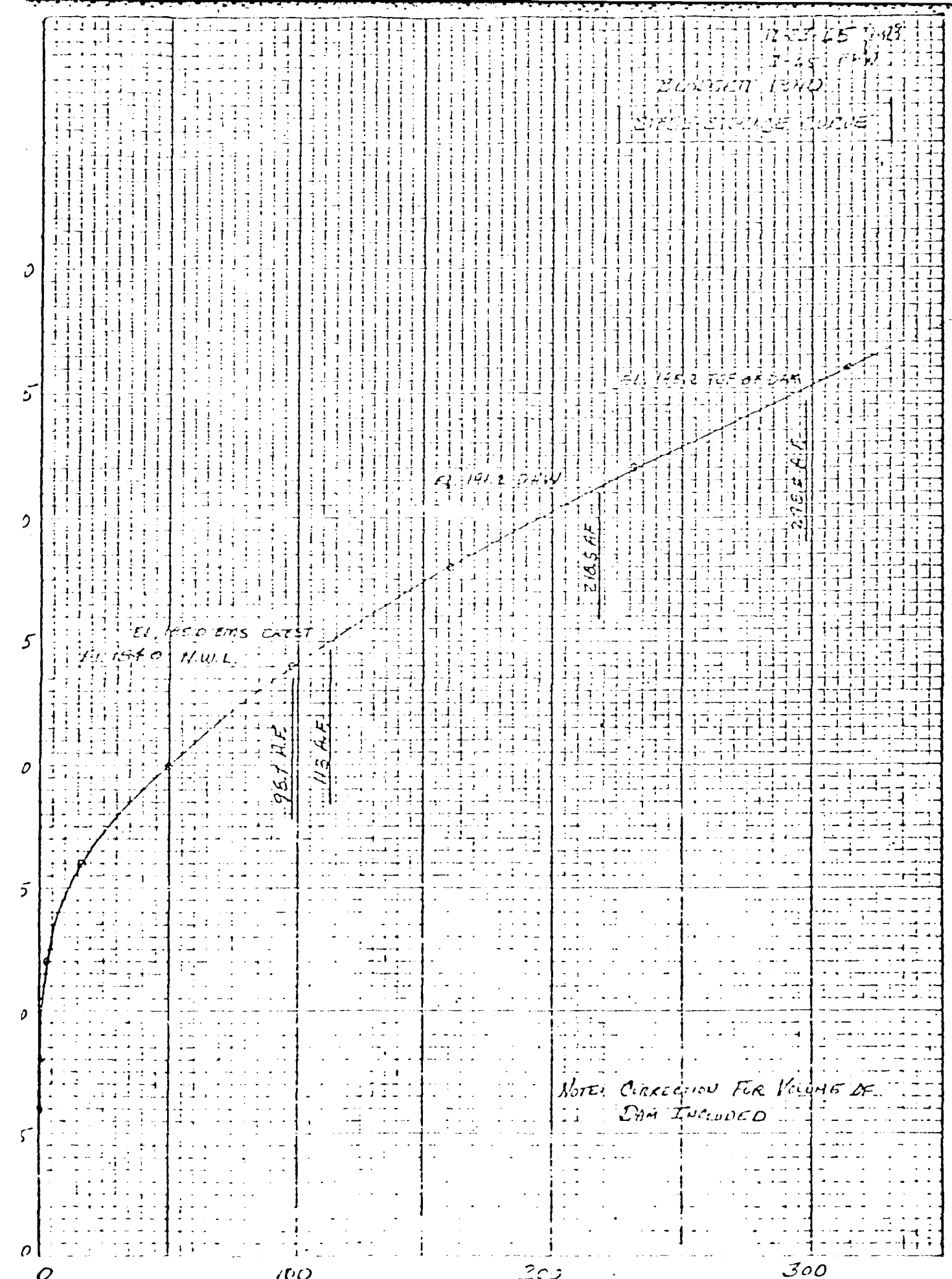


TYPICAL SECTION OF DAM

ENGINEERING & WATERSHED PLANNING UNIT, UPPER DARBY, PA.

Element of Structure	Determining Factor	Elevation	Surface Area Acres	Storage		Inflow		Peak Outflow c.f.s.
				Acre-Feet	Inches*	Volume Inches*	Rate c.f.s.	
Crest of principal spillway		184.0	14.4	98.7	0.38			
Crest of emergency spillway	50-year frequency storm, 6 hour rainfall moisture condition III	185.0	15.0	113.0	0.44	1.94		
Design high water	1.25X minimum 6 hour precipitation - ES-1020 sheet 2 of 5, moisture condition II	191.2	19.0	218.5	0.85	3.67		
Top of dam	1.25X minimum 6 hour precipitation - ES-1020 sheet 3 of 5 moisture condition II	195.2	21.2	298.5	1.16	8.05		

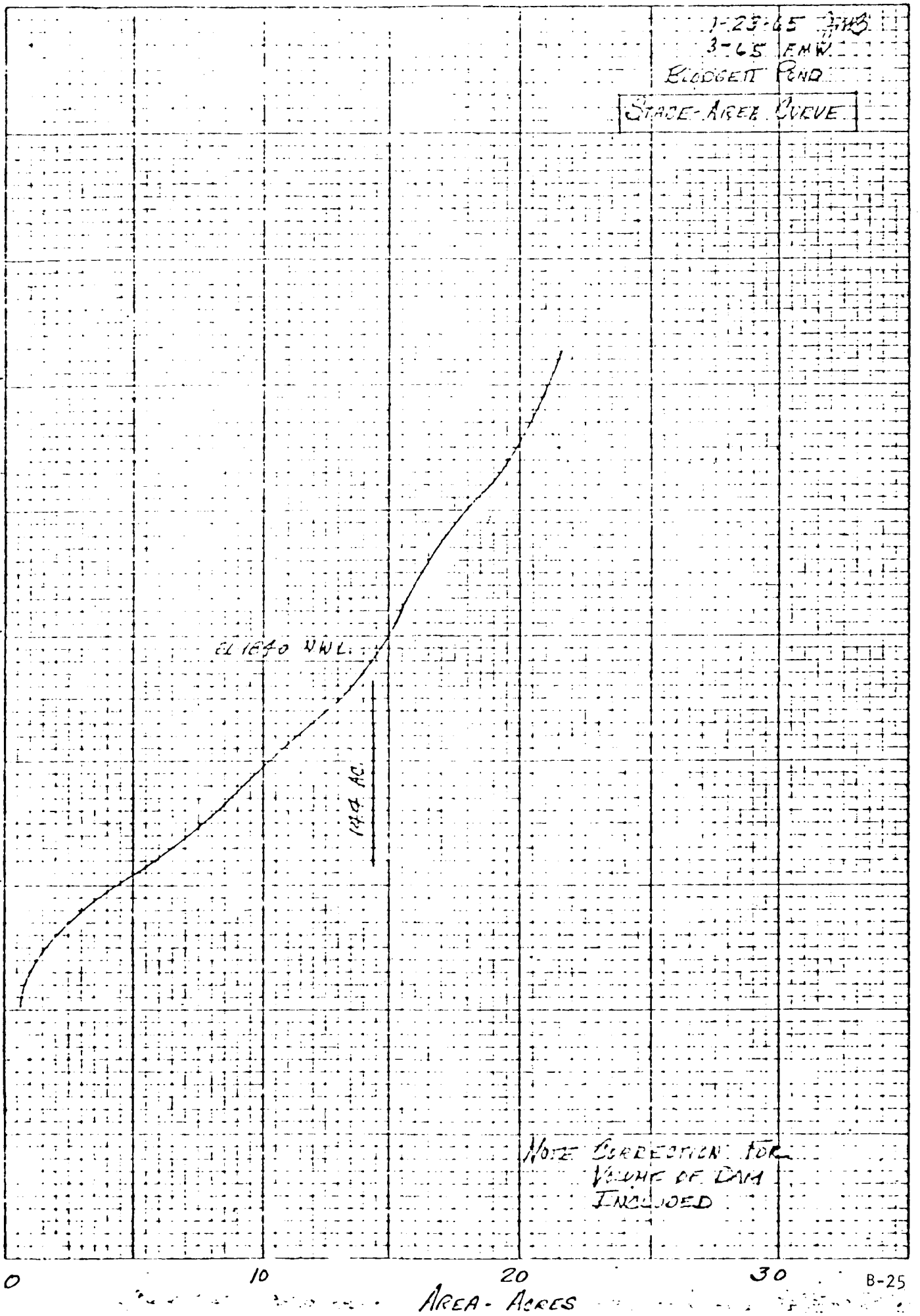
*Inches of runoff from controlled area of 3100 acres


EL. 1452 TOP OF DAM
EL. 1441.2 SPWY
218.5 A.F.
EL. 1430 EMS CREST
EL. 1424.0 N.W.L.
98.7 H.P.
113 A.F.
NOTE: CORRECTION FOR VOLUME OF DAM INCLUDED
0
100
200
300
STORAGE - ACRE FEET

1-23-65 JHS
3-65 EMW

BLODGETT POND

STAGE-AREA CURVE



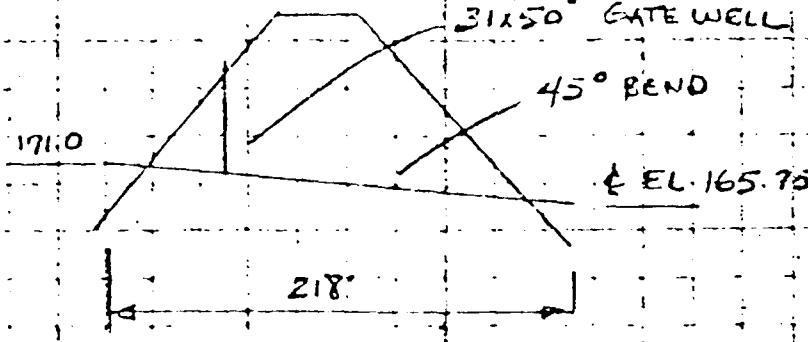
NOTE CORRECTION FOR VOLUME OF DAM INCLUDED

STATE VERMONT | PROJECT BLODGETT POND

BY GHB | DATE 3-24-65 | CHECKED BY | DATE | JOB NO.

SUBJECT CONSTRUCTION AND POND DRAIN CAPACITY | SHEET 4-11 OF

$n = 0.025$



K_e (ENTRANCE) = 0.78

K_2 (ENLARGEMENT) = 1

K_{45} (BEND)

$$K_{45} = \left[1 - \left(\frac{90-45}{90}\right)^2\right] K_{90}$$

B & S $\quad R/d = \frac{5}{1.5} = 3.34 \quad K_{90} = 0.35$ NEH 5 Fig. 5.5-5

$$K_{45} = [1 - 0.35]\,0.33 = 0.25$$

K_p (PIPE FRICTION) = 0.0674

$$C_p = \sqrt{\frac{2g}{+K_2 + K_{45} + K_{pL} + K_e}}$$

$$= \sqrt{\frac{64.4}{1 + 1 + 0.25 + 0.0674 \times 218 + 0.78}}$$

$$= \sqrt{\frac{64.4}{127.}} = 1.90$$

$Q = A\sqrt{2gH} = 1.90 \times 1.77\,\sqrt{2 \times 32.2 \times 4.5} = 33.6$ cfs

SCS-344 5-57
Tabular Computations

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Project Pond — Franklin, Vt. — 12-23-64 9HB

FHW 3-65

Stage-Storage Computations

(Correction for Volume of Dam Included)

Elev	Area Ac	Area Ac	Area Ac	Ave. Area	Dist Ft	CS Ac Ft.	Cum. Storage Ac Ft.	
166	0	0					0	
			0.10	.5	2	0.10		
168	043	0.10					0.10	
			1.42	0.71	4	2.84		
172	5.75	1.32					2.94	
			7.23	3.62	4	14.48		
176	25.75	5.91					17.42	
			16.12	8.06	4	32.24		
180	44.49	10.21					49.66	
			24.49	12.25	4	49.00		
184	62.22	14.28					98.66	
			30.79	15.40	4	61.60		
188	71.96	16.51					160.26	
			36.08	18.04	4	72.16		
192	85.22	19.57					232.42	
			41.06	20.53	4	82.12		
196	93.61	21.49					314.54	

U.S. GOVERNMENT PRINTING OFFICE: 1964 O - 743-993

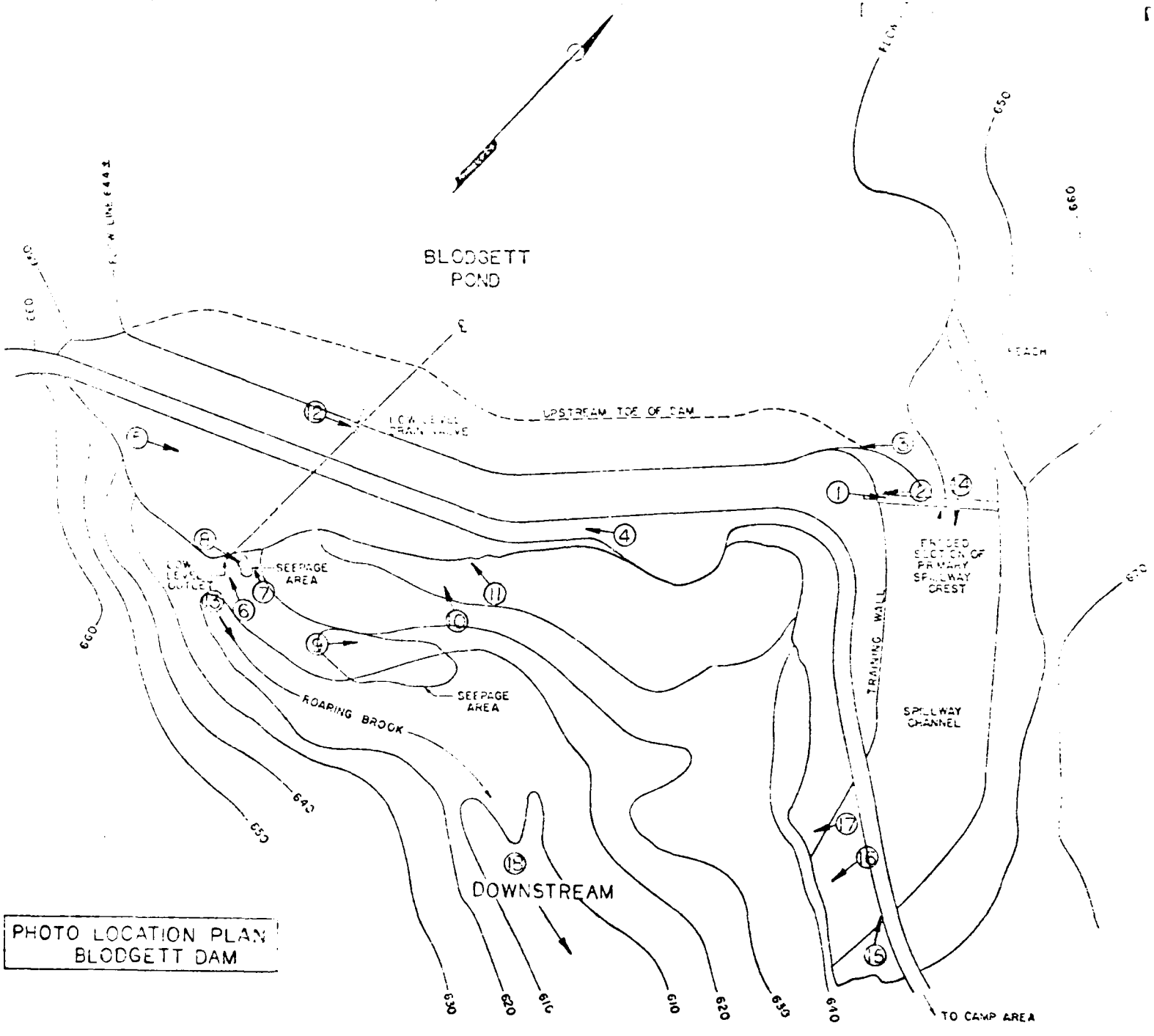
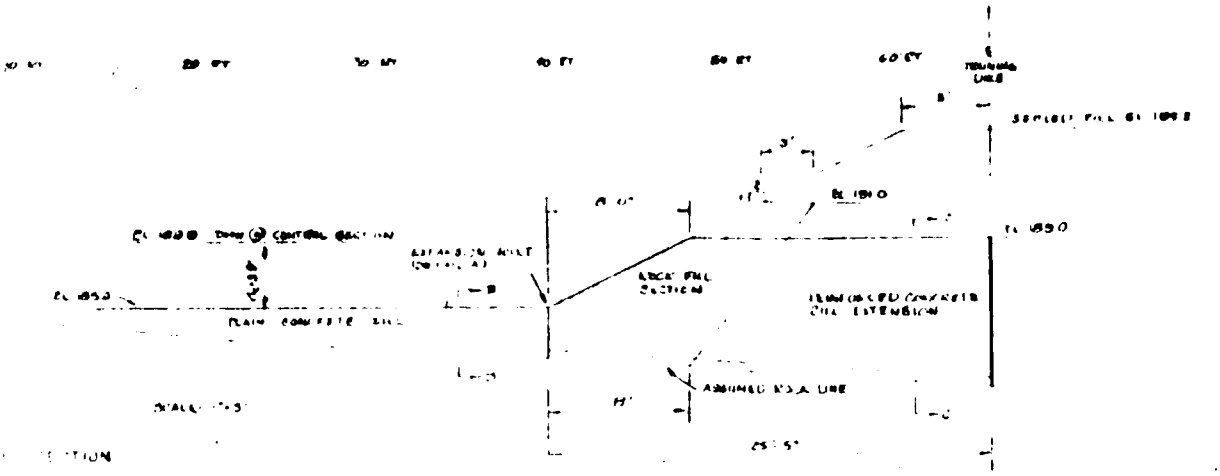


PHOTO LOCATION PLAN
BLODGETT DAM

APPENDIX C

DETAIL PHOTOGRAPHS



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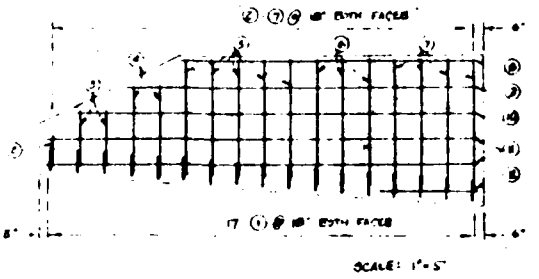

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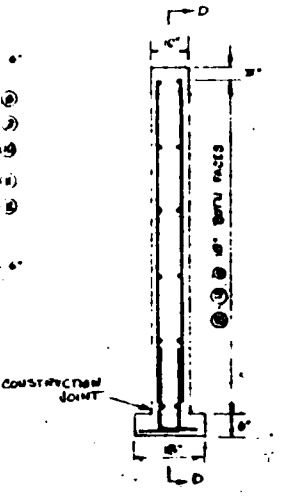
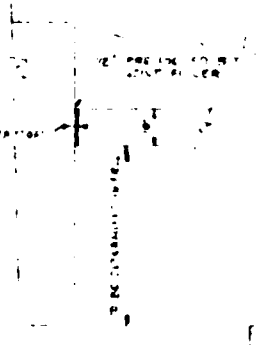
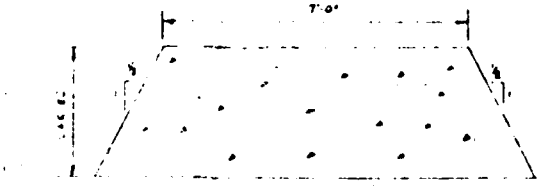


SECTION C-C

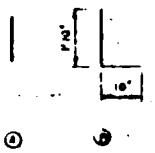


DETAIL A



CONCRETE SILL

CONSTRUCTION JOINT



BAR TYPES

STEEL SCHEDULE

MK	SIZE	SIZE	LENGTH	TYPE	TOTAL
1	54	4	2 5"	B	80.67
2	C	4	19"	A	3 50
3	4	4	3' 3"	A	8 00
4	4	4	5'0"	A	20 00
5	5	4	6'3"	A	62 50
6	6	4	7'5"	A	43 50
7	8	4	9"	A	60 00
8	2	4	11"	A	34 00
9	2	4	13'0"	A	40 00
10	2	4	23'0"	A	46 00
11	4	4	24'5"	A	33 50
12	2	4	5'5"	A	11 00

STEEL QUANTITY

#4 BARS 5,400 LBS TOTAL 2592 LBS

CONCRETE QUANTITY

SILL	180 C.Y.
SILL EXTENSION	61 C.Y.
TOTAL	241 C.Y.

B-33

VA Water Resources
Town County

NOT TO SCALE

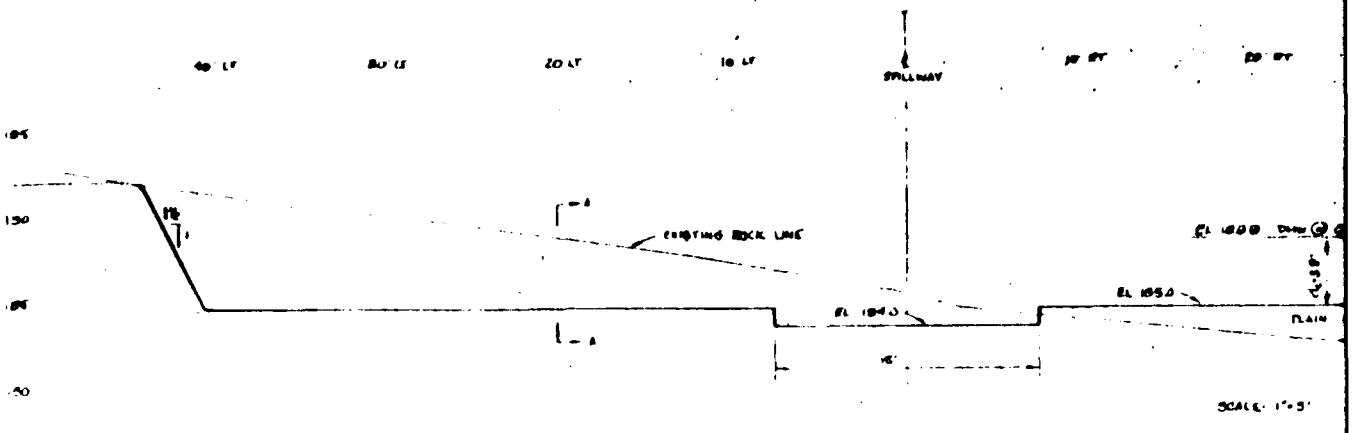
BLODGETT POND
WHITE RIVER RC&D PROJECT
BRADFORD, VERMONT
CONSTRUCTION REVISION-SPILLWAY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

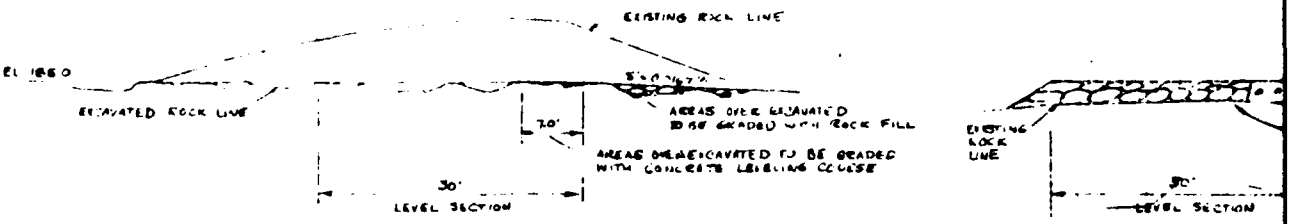
Designed ... Date ...
Drawn J.REGENT 8/66
Traced ...
Checked P.CARLSON 8/66
Approved by K.B.I. SCS
Title ...
Date ...
Sheet ... Drawing No. ...

Sol 2

REPRODUCED AT GOVERNMENT EXPENSE

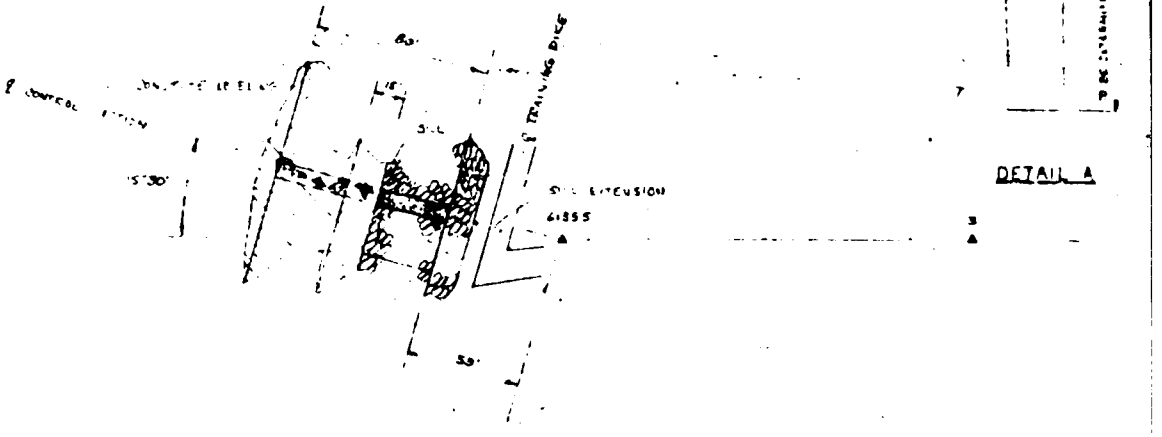


PROFILE ALONG ℄ OF CONTROL SECTION



SECTION A-A

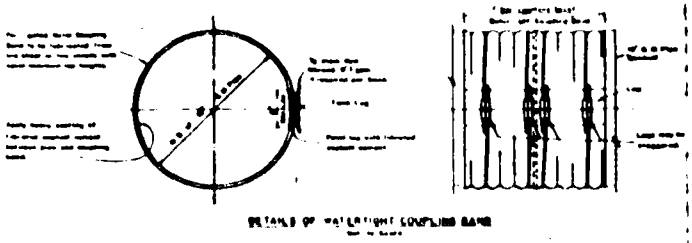
SECTION B-B



PLAN OF LEVEL SECTION

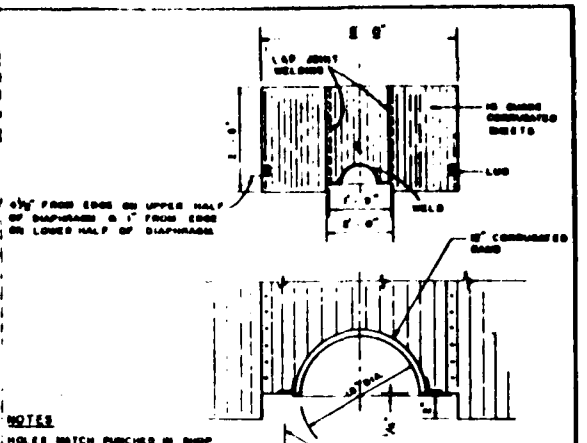
I-33

REPRODUCED AT GOVERNMENT EXPENSE

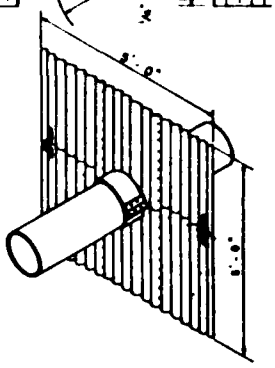


DETAILS OF WATERTIGHT COUPLING BAND

NOTE
STANDARD 2 PIECE WATERTIGHT COUPLING BAND MAY BE SUBSTITUTED FOR ABOVE

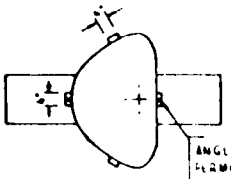


NOTES
HOLES MATCH PUNCHED IN SHOP TO PERMIT FIELD BOLTING
GALVANIZED BOLTS TO BE FURNISHED WITH DIAPHRAGM
LAP BETWEEN TWO SECTIONS TO RECEIVE EXTRA BITUMINOUS COATING AT TIME OF ASSEMBLY
DIAPHRAGM TO BE FULLY BITUMINOUS COATED

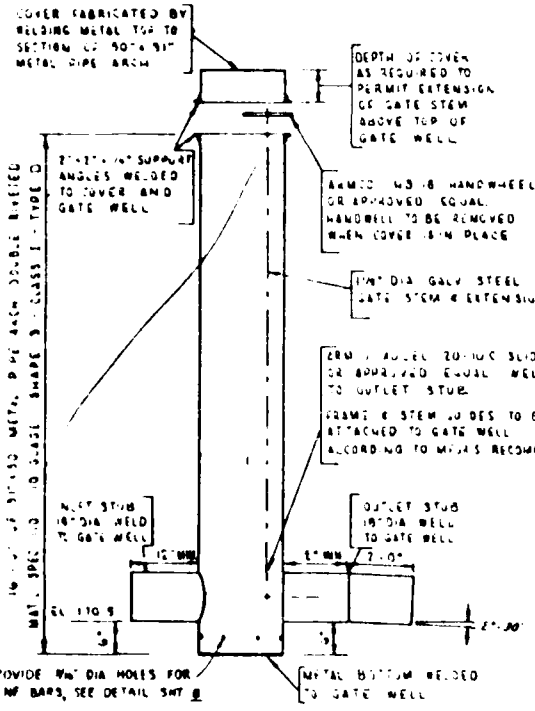


DETAILS OF ANTI-SEEP COLLAR

NOT TO SCALE — 7 REQ'D.

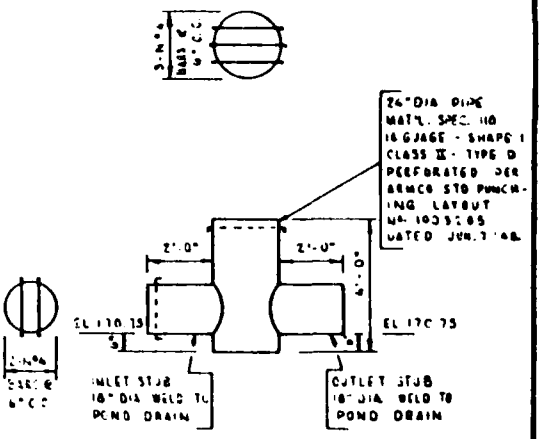


PLAN VIEW



NOTE
ENTIRE ASSEMBLY TO BE SHOP FABRICATED

DETAILS OF SLICE GATE WELL ASSEMBLY
NOT TO SCALE



DETAILS OF POND DRAIN INLET ASSEMBLY
NOT TO SCALE

HAND PLACED ROCK TO PROVIDE TRANSITION BETWEEN ANTI SEEP COLLAR AND POND DRAIN PIPE

APPROX SOUND ROCK

TRENCH ROCK SUPPORT
SCALE

NOT TO SCALE

B-32

BLODGETT POND
WHITE RIVER R.C. AND D. PROJECT
BRADFORD, VERMONT
STRUCTURAL DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J.H. BRYANT	Mar '68	Approved by	
J.W. ZURLO	Mar '68	Title	
Drawn M. NIEDLICH	MAY '68		
H.T. BROWNING JR.	MAR. '68	Title	
Traced			
Checked Wm A. Anderson Jr.		Sheet No. 7 of 10 sheets	Drawing No. VT-

Form SCS-348 (December 1968)

Page 6

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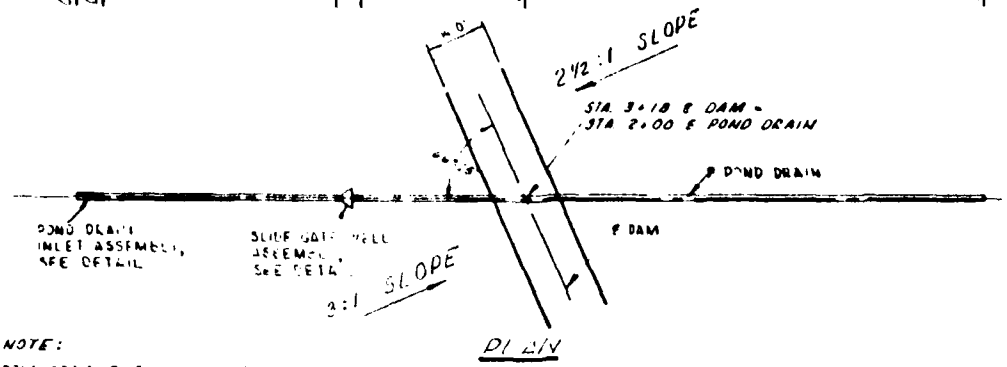
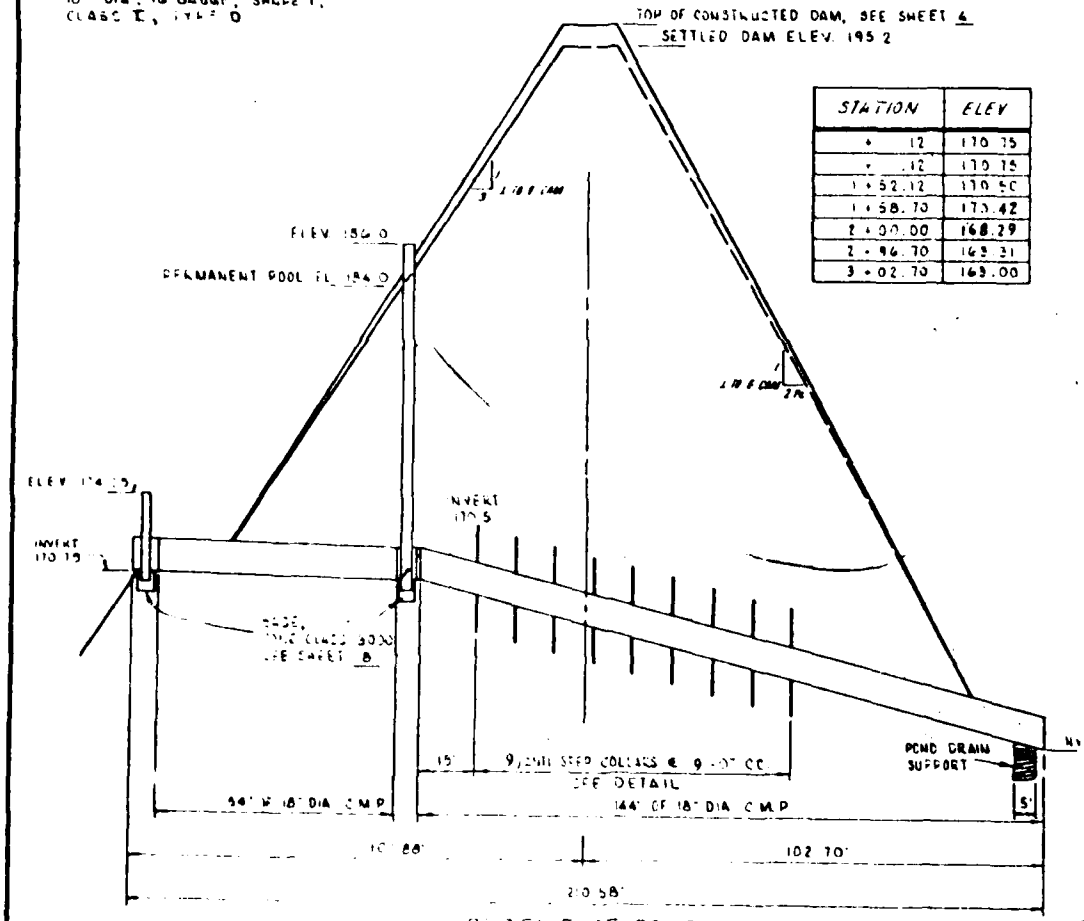


PLAN

NOTE:
POND DRAIN PIPE SHALL CONFORM TO MAT'L. SPEC. 110 AND SHALL BE 18" DIA., 16 GAUGE, SHAPE 1, CLASS E, TYPE O

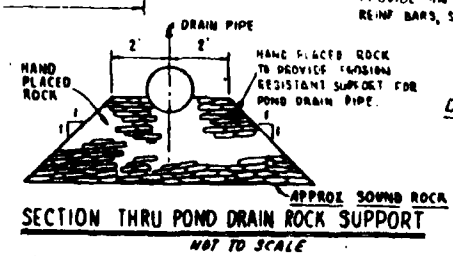


STATION	ELEV
+ .12	170.75
+ .12	170.75
1+52.12	170.50
1+58.70	170.42
2+00.00	168.29
2+96.70	165.31
3+02.70	165.00

PROFILE OF POND DRAIN
NOT TO SCALE

BILL OF MATERIAL

LOCATION	ITEM	SIZE	LENGTH	QUANTITY
	C.M.P.	18" DIA.	199'	
	SLIDE GATE WELL ASSEMBLY	—	—	1
	POND DRAIN INLET ASS'Y	—	—	1
	ANTI-SEEP COLLARS, C.M.	5' x 5'	—	9
	WATERTIGHT COUPLING BANDS			12



SECTION THRU POND DRAIN ROCK SUPPORT
NOT TO SCALE

NOTE:
STANDARD 2 ℄
MAY BE SUBS

COVER FABRIC
WELDING METAL
SECTION OF SL
METAL PIPE AR

ANGLES
TO COVER
GATE W

INLET STU
18" DIA. M
TL GATE M

EL 170.5

PROVIDE ⅜" DIA H
REINF BARS, SEE DE

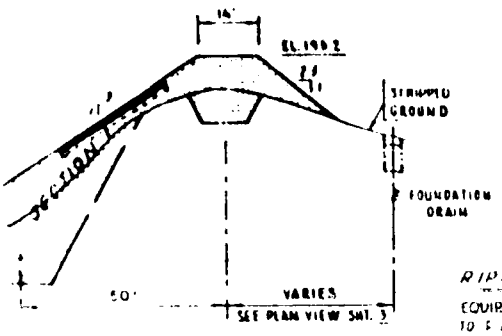
NOTE

DETA

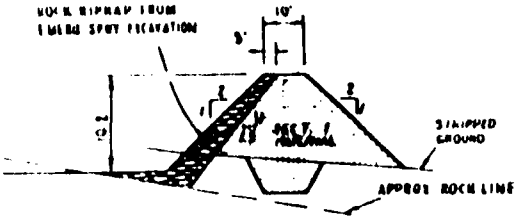
P. 32

10 of 2

REPRODUCED AT GOVERNMENT EXPENSE



SECTION CC



TYP SECT OF DIKE

RIPRAP

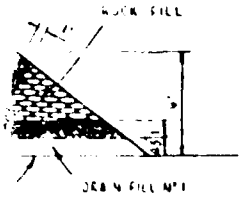
EQUIV. A 50 RIPRAP SHALL BE WELL GRADED FROM A MAX SIZE OF 24" TO 1" SPALLS SUITABLE TO FILL VOIDS BETWEEN ROCKS

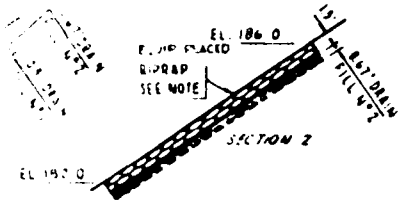
SECTION 1

FINE GRAINED SILTY CLAY MATERIAL (CL-ML)
REPRESENTED BY FIELD SAMPLE NO COIL1 FROM TP-201 (3' TO 4') BORROW "B" (3' TO 4')

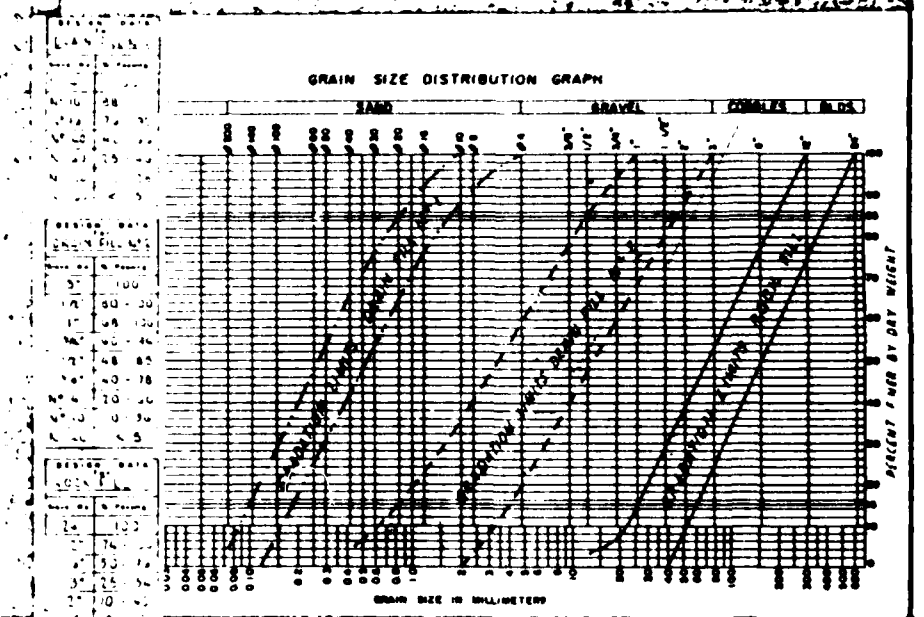
SECTION 2

SILTY SAND MATERIAL (SM)
REPRESENTED BY FIELD SAMPLE NO 1001 (2'TO 8.7') FROM TP 105 TP 202 [illegible]





TYPICAL SECTION OF RIPRAP & BEDDING WHEN UPSTREAM SHELL CONSISTS OF SECTION 2 MATERIAL

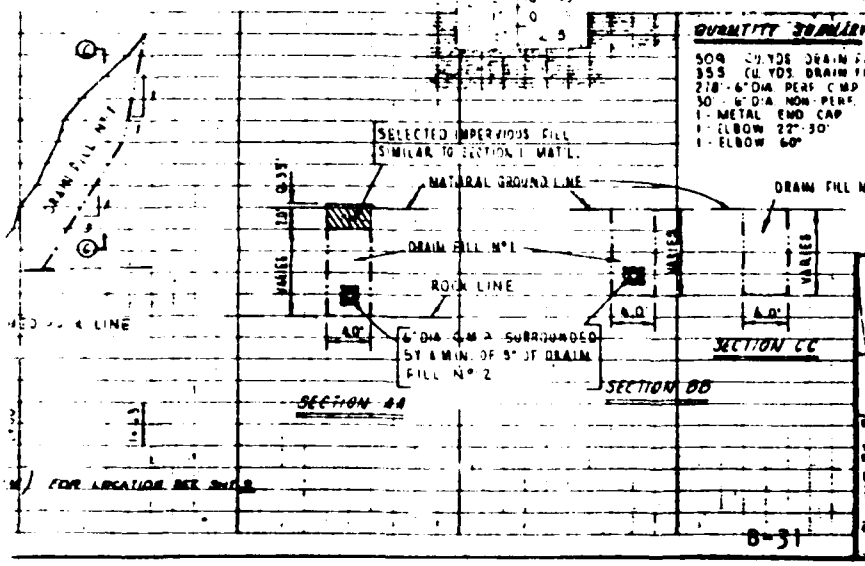


QUANTITY ESTIMATE

509 CU YDS DRAIN FILL N°1
355 CU YDS DRAIN FILL N°2
218 - 6" DIA PERF CMP
50 - 6" DIA NON-PERF CMP
1 - METAL END CAP
1 - ELBOW 22°-30°
1 - ELBOW 60°

NOTE

ALL DRAIN PIPE SHALL CONFORM TO MATERIAL SPEC 110 & SHALL BE 6" DIA, 16 GAUGE, SHAPE I, CLASS II, TYPE A.



NOT TO SCALE

BLODGETT POND
WHITE RIVER R.C. AND D. PROJECT
BRADFORD, VERMONT

DRAINAGE DETAILS

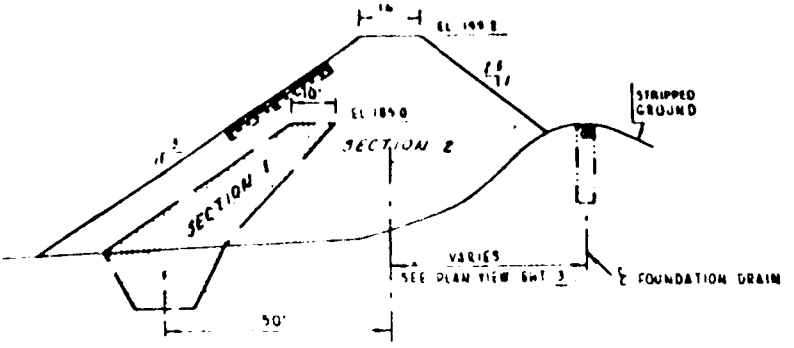
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J.M. EURLO	Date May '66	Approved by Title	
Drawn H.T. BROWNING JR.	Date MAY '66	Title	
Traced			
Checked J.M. Eurlo	Date	Sheet No. 6	Drawing No. VT-

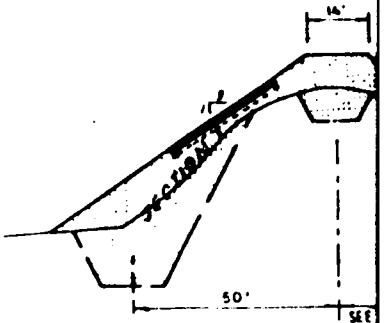
8-31

Form [illegible]

REPRODUCED AT GOVERNMENT EXPENSE

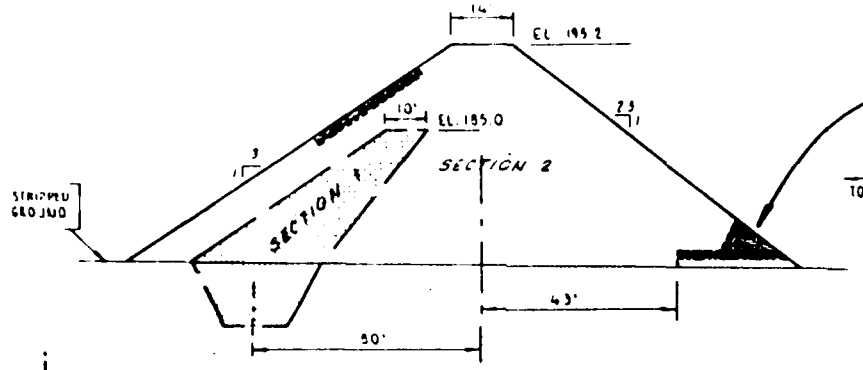


SECTION BB

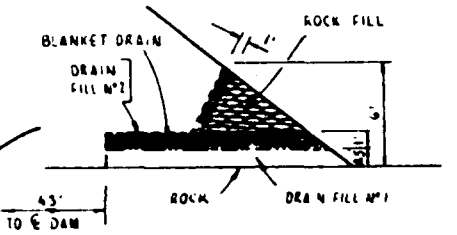


SECTION CC

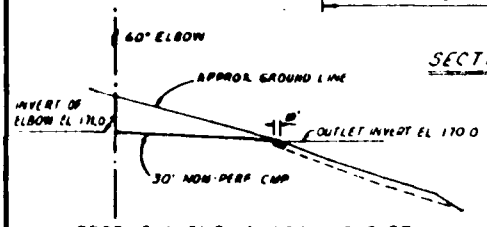
FOR LOCATION OF DAM SECTIONS SEE SHT 3, PLAN OF DAMSITE



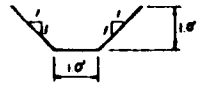
SECTION AA



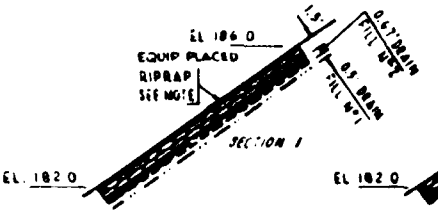
ROCK TOE DETAIL



PROFILE ALONG ℄ DRAIN OUTLET

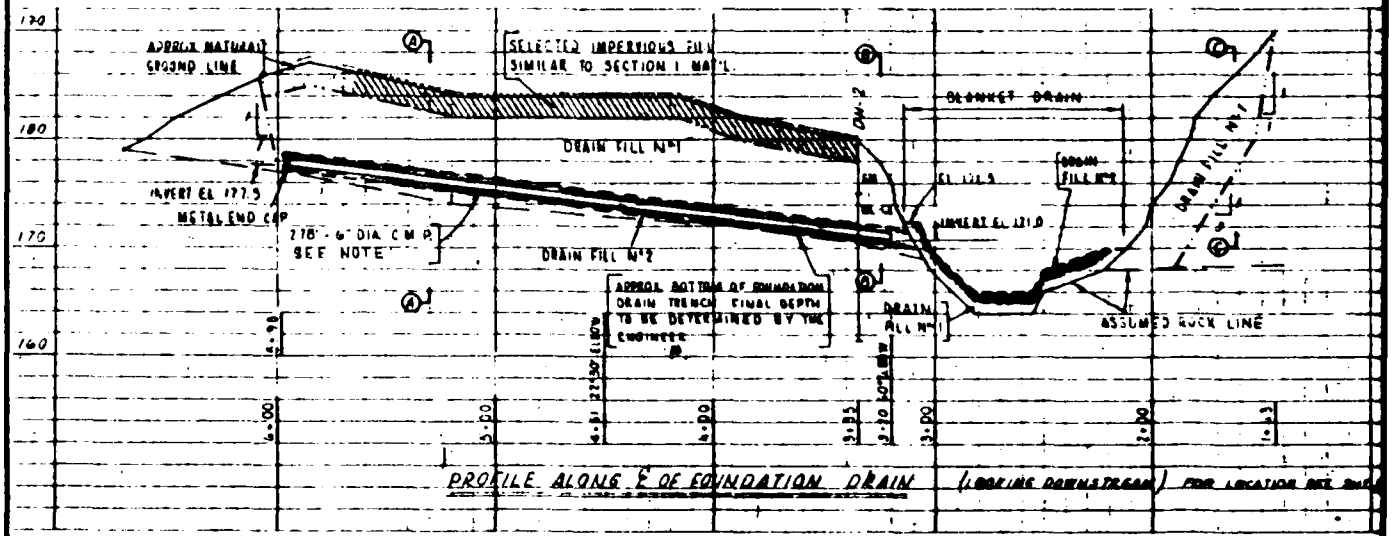


SECTION ALONG DRAIN OUTLET DITCH



TYPICAL SECTION OF RIPRAP & BEDDING WHEN UPSTREAM SHELL CONSISTS OF SECTION 1 MATERIAL

TYPICAL SECTION O BEDDING WHEN U SHELL CONSISTS MATERIAL

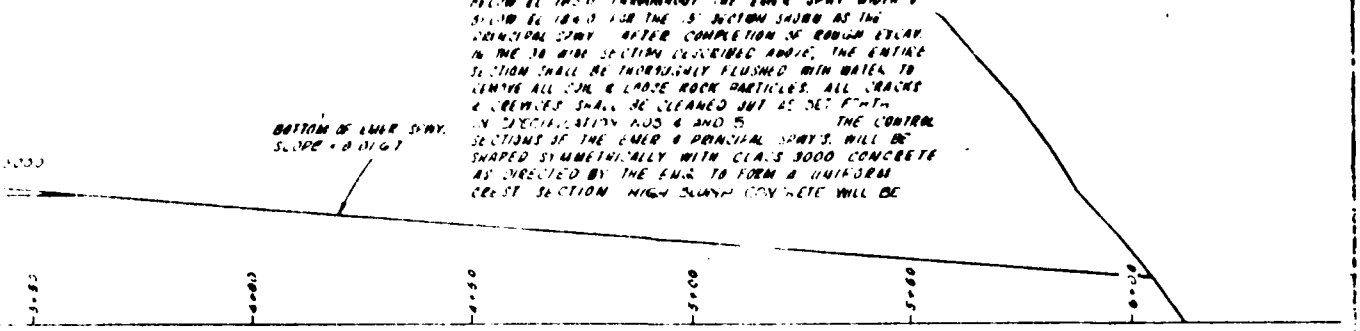


PROFILE ALONG ℄ OF FOUNDATION DRAIN (LOOKING DOWNSTREAM) FOR LOCATION SEE SHT

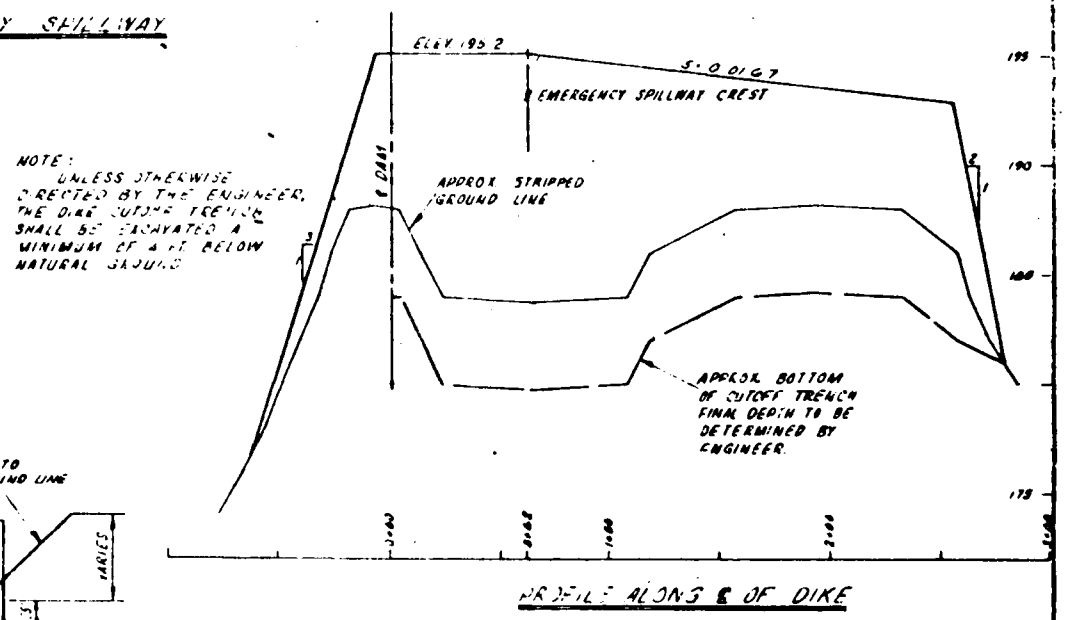
B-3

10/32

NOTE:
THE LOWER SPRAY SECTION WILL BE EXCAVATED AS NEARLY TO GRADE AS THE SKILLFUL OPERATION OF A BACKHOE PERMITS, EXCEPTION A ROCK SUPPORT ATTACHMENT WILL REQUIRE SUBSTANTIAL ROCK WITHIN 10 INCHES OF THESE GRADES SHALL BE DETERMINED BY THE ENGINEER. THE SECTION FROM STA 2+90 TO 3+20 (APPROX.) SHALL BE EXCAVATED SO THAT ALL POINTS ARE ABOVE EL 1630 THROUGHOUT THE LOWER SPRAY BASIN & ABOVE EL 1640 FOR THE 15' SECTION SHOWN AS THE PRINCIPAL SPRAY. AFTER COMPLETION OF ROUGH EXCAVATION OF THE 30 FOOT SECTION DESCRIBED ABOVE, THE ENTIRE SECTION SHALL BE THOROUGHLY FLUSHED WITH WATER TO REMOVE ALL COAL & LOOSE ROCK PARTICLES. ALL CRACKS & CREVICES SHALL BE CLEANED OUT AS SET FORTH IN SPECIFICATION NOS 4 AND 5. THE CONTROL SECTIONS OF THE LOWER & PRINCIPAL SPRAYS WILL BE SHAPED SYMMETRICALLY WITH CLASS 3000 CONCRETE AS DIRECTED BY THE ENG TO FORM A UNIFORM CREST SECTION. HIGH SLUMP CONCRETE WILL BE USED TO FILL CRACKS AND CREVICES WHILE LOW SLUMP UNFORMED CONCRETE WILL BE USED TO SHAPE THE CREST SECTION. PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE PER CUBIC YARD AS MEASURED AT THE MIXING PLANT.

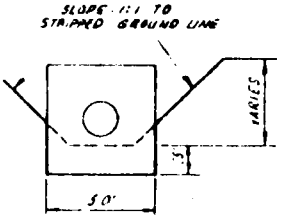


MAIN AND EMERGENCY SPILLWAY

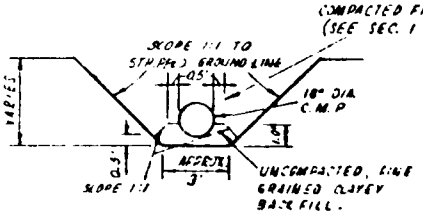


PROFILE ALONG ℄ OF DIKE

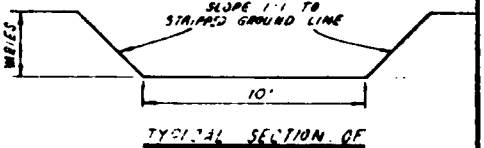
NOTE:
UNLESS OTHERWISE DIRECTED BY THE ENGINEER, THE DIKE SUPPORT TRENCH SHALL BE EXCAVATED A MINIMUM OF 4 FT BELOW NATURAL GROUND



TYP SECT OF POND DRAIN EXCAVATION & ANTI-SEEP COLLAR



TYP SECT OF POND DRAIN EXCAVATION



TYPICAL SECTION OF DIKE CUTOFF TRENCH

NOT TO SCALE

B-30

BLODGETT POND
WHITE RIVER R.C. AND D. PROJECT
BRADFORD, VERMONT
PROFILES

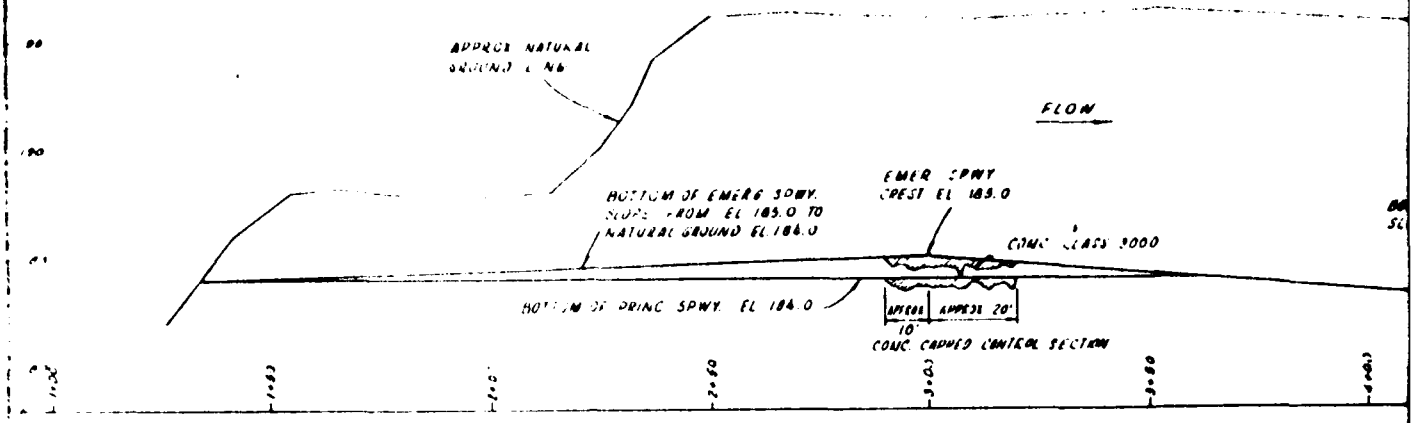
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

J.H. BRYANT Mar '65 Date
Designed A.M. ZURLO May '65
Drawn M.I. BRUNNING JR. May '65
Traced
Checked Wm A. Hanson Jr.
Approved by
Title
Title
Sheet No. 5 of 10
Drawing No. VT-

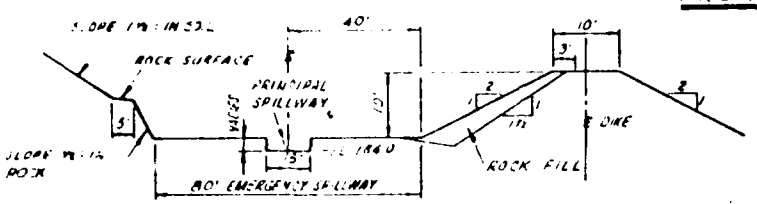
FORM SCS 316 (APRIL 1965)

5 of 2

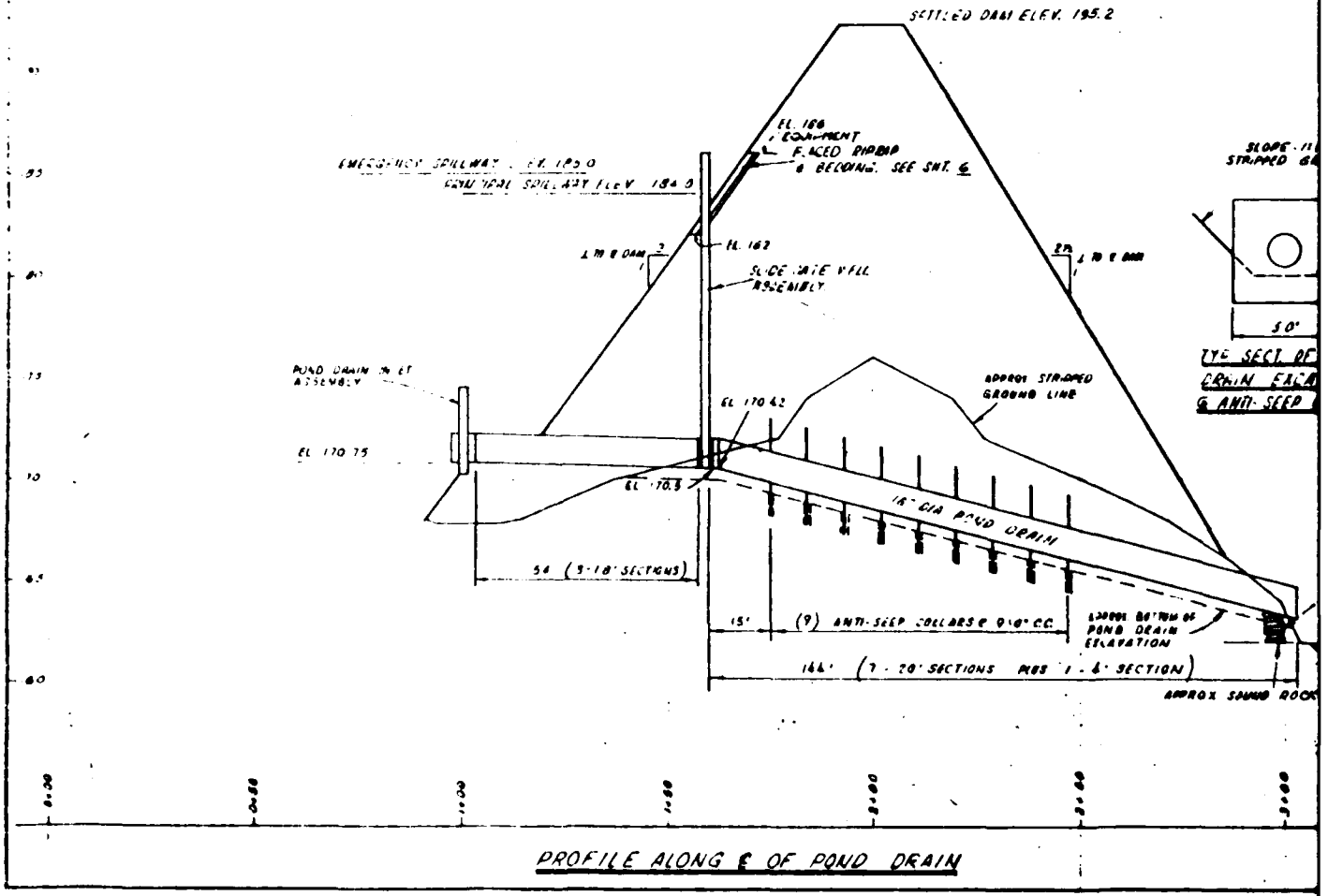
REPRODUCED AT GOVERNMENT EXPENSE



PROFILE ALONG ℄ OF PRINCIPAL AND EMERGEN



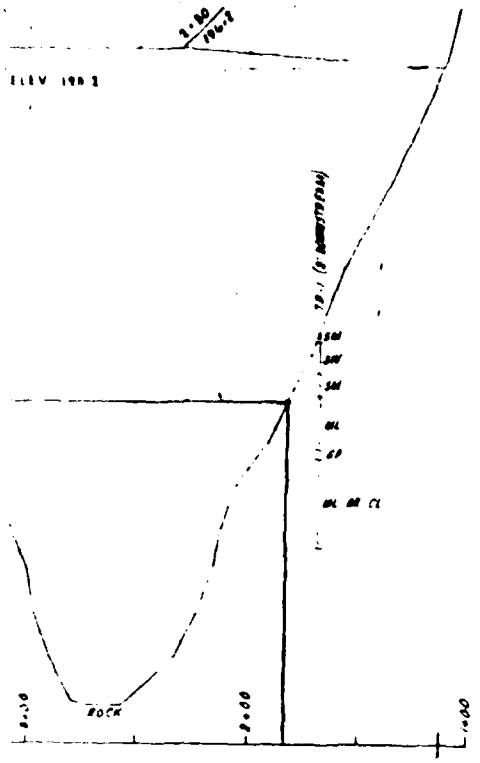
TYPICAL SECTION OF PRINCIPAL & EMERGENCY SPILLWAY



PROFILE ALONG ℄ OF POND DRAIN

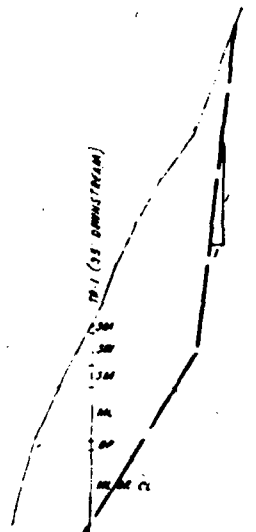
B-30 1 of 2

REPRODUCED AT GOVERNMENT EXPENSE



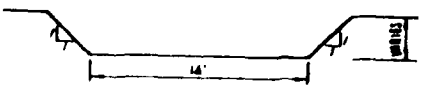
NOTE:
UNLESS OTHERWISE DIRECTED BY THE ENGINEER, THE C CUTOFF SHALL EXTEND BELOW FROST PENETRATION DEPTH OR BELOW SILTY SAND (SM) MATERIAL, REPRESENTED BY DRILL HOLE 1 & 2 FROM 0 TO 5 FT WHICHEVER IS GREATER

TYPICAL SECTION
CENTERLINE CUTOFF TRENCH



NOTE:
UNLESS OTHERWISE DIRECTED BY THE ENGINEER, THE DAM CUTOFF TRENCH SHALL BE EXCAVATED A MINIMUM OF 10 FT BELOW NATURAL GROUND. WHERE ROCK IS ENCOUNTERED THE TRENCH SHALL EXTEND ONLY TO THE SURFACE OF SOUND, HARD ROCK OR INTO WEATHERED ROCK TO A MINIMUM DEPTH OF 5 FT.

NOTE:
FOR DESCRIPTION OF LOGS SEE SHEETS 9 & 10



TYPICAL SECTION
UPSTREAM CUTOFF TRENCH
℄ STA. 1+10 TO 6+20

APPROX BOTTOM OF UPSTREAM CUTOFF TRENCH (SEE NOTE) FINAL DEPTH TO BE DETERMINED BY ENGINEER.

(℄ DAM STATION:)

(DISTANCE ALONG TRENCH)

TYPICAL SECTION
UPSTREAM CUTOFF TRENCH
℄ STA. 6+20 TO ℄ DIKE

SEE SHT 9 - PLAN OF DOWNSTR

NOT TO SCALE

BLODGETT POND
WHITE RIVER R.C. AND D. PROJECT
BRADFORD, VERMONT
PROFILES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J. R. FORD	Date DEC '58	Approved by	
Drawn M. BIRDLICK	Date May '59	Title	
Traced		Date	
Checked J. M. Burns	Date 5-6	Sheet No. 4 of 10	Drawing No. VT-

FORM SCS 316 APRIL 1964

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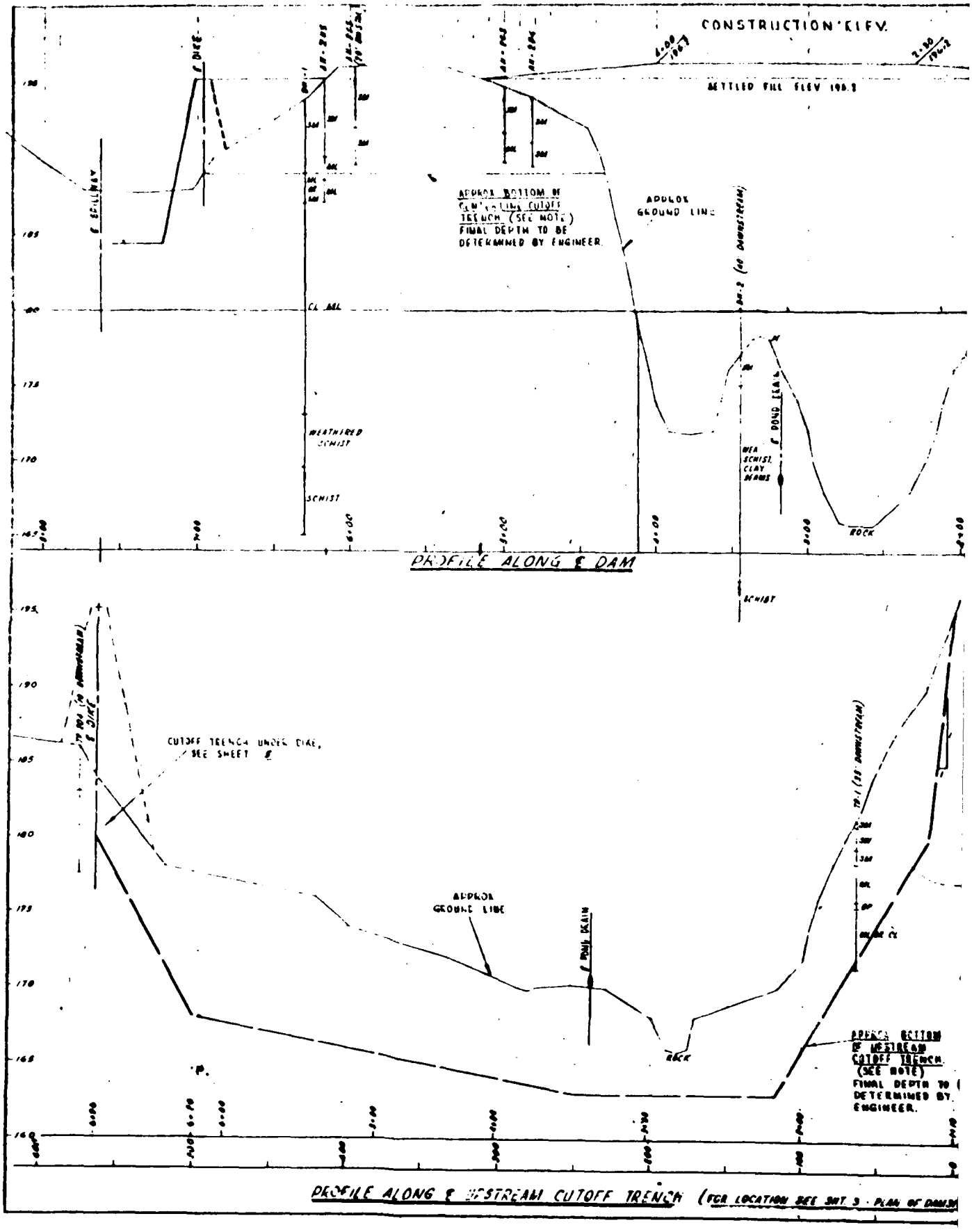
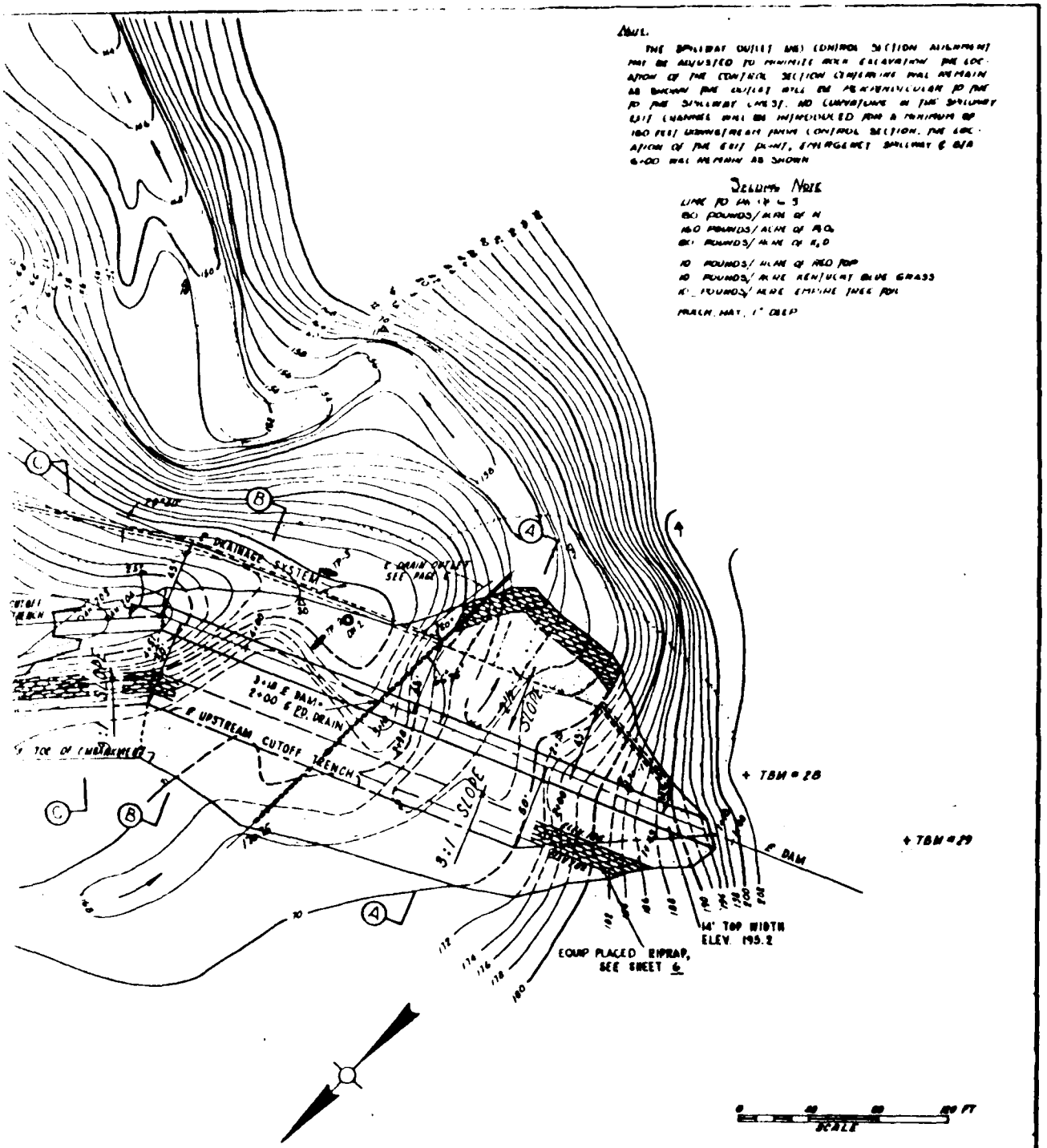

CONSTRUCTION ELEV.
SETTLED FILL ELEV 198.5
APPROX BOTTOM OF CUTOFF TRENCH (SEE NOTE) FINAL DEPTH TO BE DETERMINED BY ENGINEER.
APPROX GROUND LINE
WEATHERED SCHIST
SCHIST
WEA. SCHIST, CLAY SEAMS
ROCK
PROFILE ALONG ℄ DAM
CUTOFF TRENCH UNDER DIKE, SEE SHEET 8
APPROX GROUND LINE
APPROX BOTTOM OF UPSTREAM CUTOFF TRENCH (SEE NOTE) FINAL DEPTH TO BE DETERMINED BY ENGINEER.
PROFILE ALONG ℄ UPSTREAM CUTOFF TRENCH (FOR LOCATION SEE SHT. 3 - PLAN OF DAM)

E-27 10 of 2

REPRODUCED AT GOVERNMENT EXPENSE



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2 of 2

REPRODUCED AT GOVERNMENT EXPENSE

EMERGENCY SPILLWAY

CURVE DATA

CURVE I

STATION	DEFLECTION	CHORD
PC - 3+00	0	0
2+76	4° 29'	24.91
2+50	8° 57'	24.91
2+25	13° 26'	24.91
2+00	17° 54'	24.91
PI - 1+83.55	20° 31'	16.45

Δ = 41° - 42'
R = 160'
D = 35.81°
T = 60.94'
E = 11.19'
M = 10.46'
L = 116.48'

CURVE II

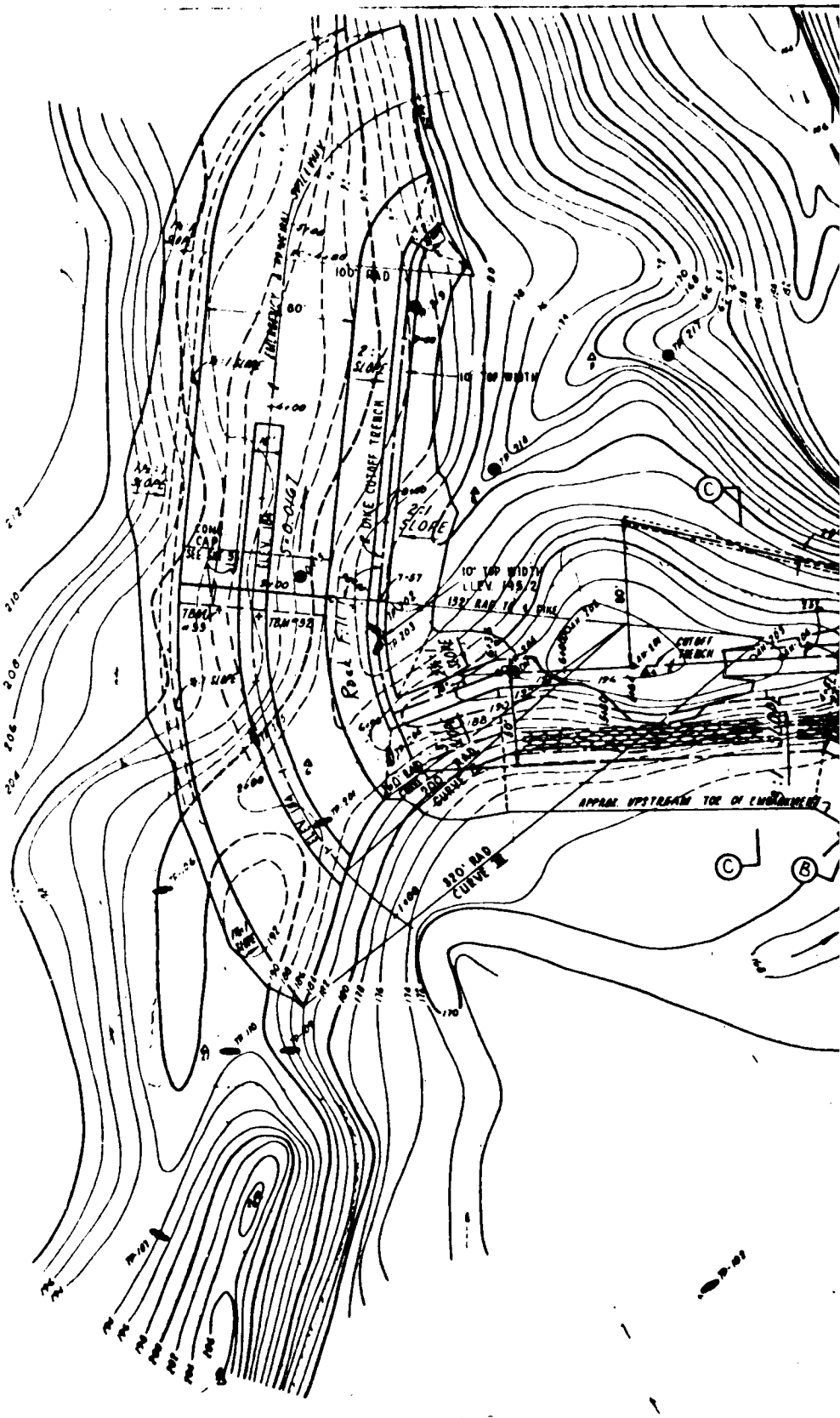
STATION	DEFLECTION	CHORD
PC - 3+00	0	0
2+75	3° 35'	24.98
2+50	7° 10'	24.98
2+25	10° 45'	24.98
2+00	14° 19'	24.98
1+75	17° 54'	24.98
1+50	21° 29'	24.98
PT - 1+34.21	23° 45'	15.79

Δ = 47° - 30'
R = 200'
D = 28.65°
T = 88.00'
E = 18.50'
M = 16.93'
L = 165.79'

CURVE III

STATION	DEFLECTION	CHORD
PC - 3+00	0	0
2+75	2° 16'	25.00
2+50	4° 29'	25.00
2+25	6° 43'	25.00
2+00	8° 57'	25.00
1+75	11° 11'	25.00
1+50	13° 26'	25.00
1+25	15° 40'	25.00
1+00	17° 54'	25.00
0+75	20° 9'	25.00
PT - 0+56.98	21° 45'	18.02

Δ = 49° - 30'
R = 320'
D = 17.90°
T = 127.67'
E = 24.48'
M = 27.74'
L = 249.02'



B-2

10 of 2

(1) Primary/Secondary Spillway Crest Wall, Showing Eroded Section. Bedrock in Background is Left Abutment of Dam.

(2) Reinforced Concrete Sill Extension at Right End of Spillway

U.S. ARMY ENGINEER DIV, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Blodgett Dam VT 00117 Bradford, Vermont April 22, 1980
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		C-2

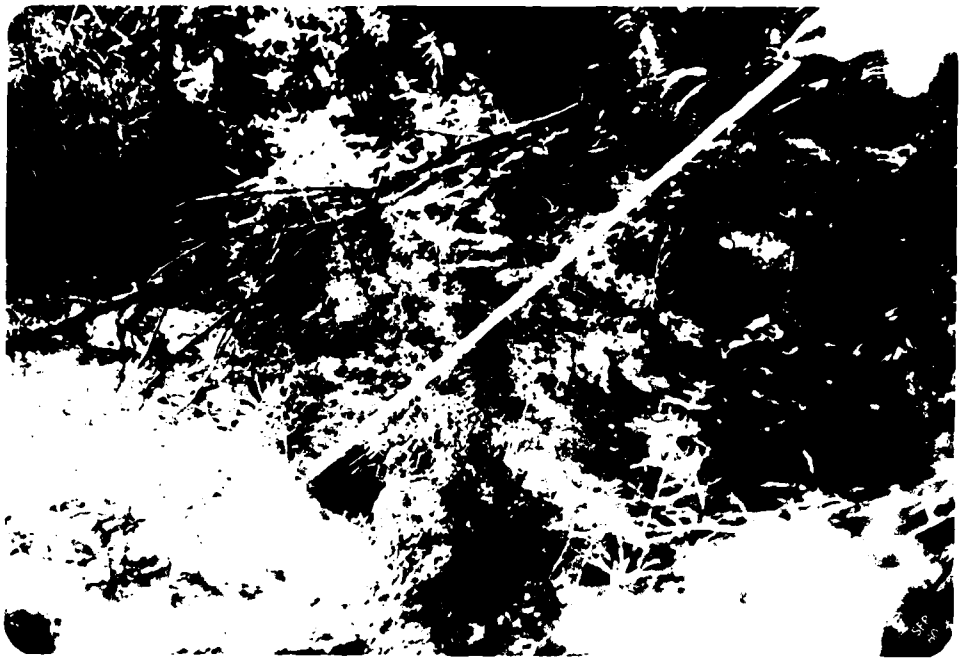
(3) Upstream Slope of Dam From Spillway Channel Entrance.

(4) Crest of Dam, Looking Toward Right Abutment.

(5) Downstream Slope, from Point Near Right Abutment.

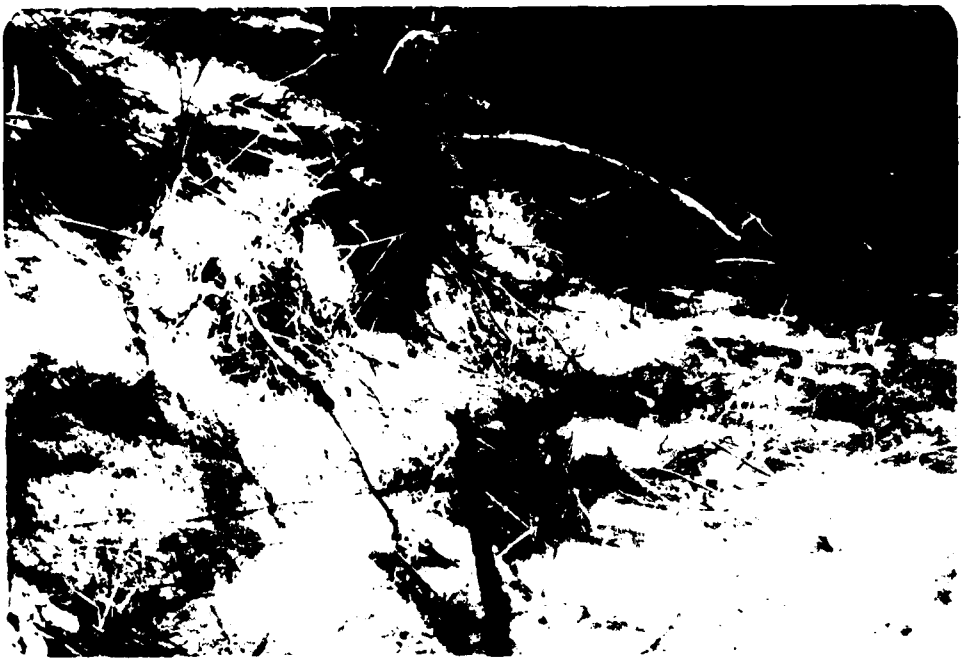
(6) Low Level Outlet at Toe of Dam.

U.S.ARMY ENGINEER DIV, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Blodgett Dam VT00117 Bradford, Vermont April 22, 1980
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		C-4



(7) Seepage Immediately Downstream of Drainage Outlet Pipe.

(8) Pool Downstream of Seepage in Photo (7).



(9) Partial View of Extensive Area of Seepage in Original Ground Below Toe of Dam.

(10) Seepage Exiting Original Ground at Base of Tree.

(11) Animal Burrow Near Toe of Dam.

(12) Low Level Outlet Gate Housing.

U.S.ARMY ENGINEER DIV, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Blodgett Dam VT 00117 Bradford, Vermont April 22, 1980
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		C-7

(13) Low Level Outlet Channel.

(14) Spillway Channel, From Primary/Secondary Spillway Crest.

(15) Roadway Across Spillway Channel.

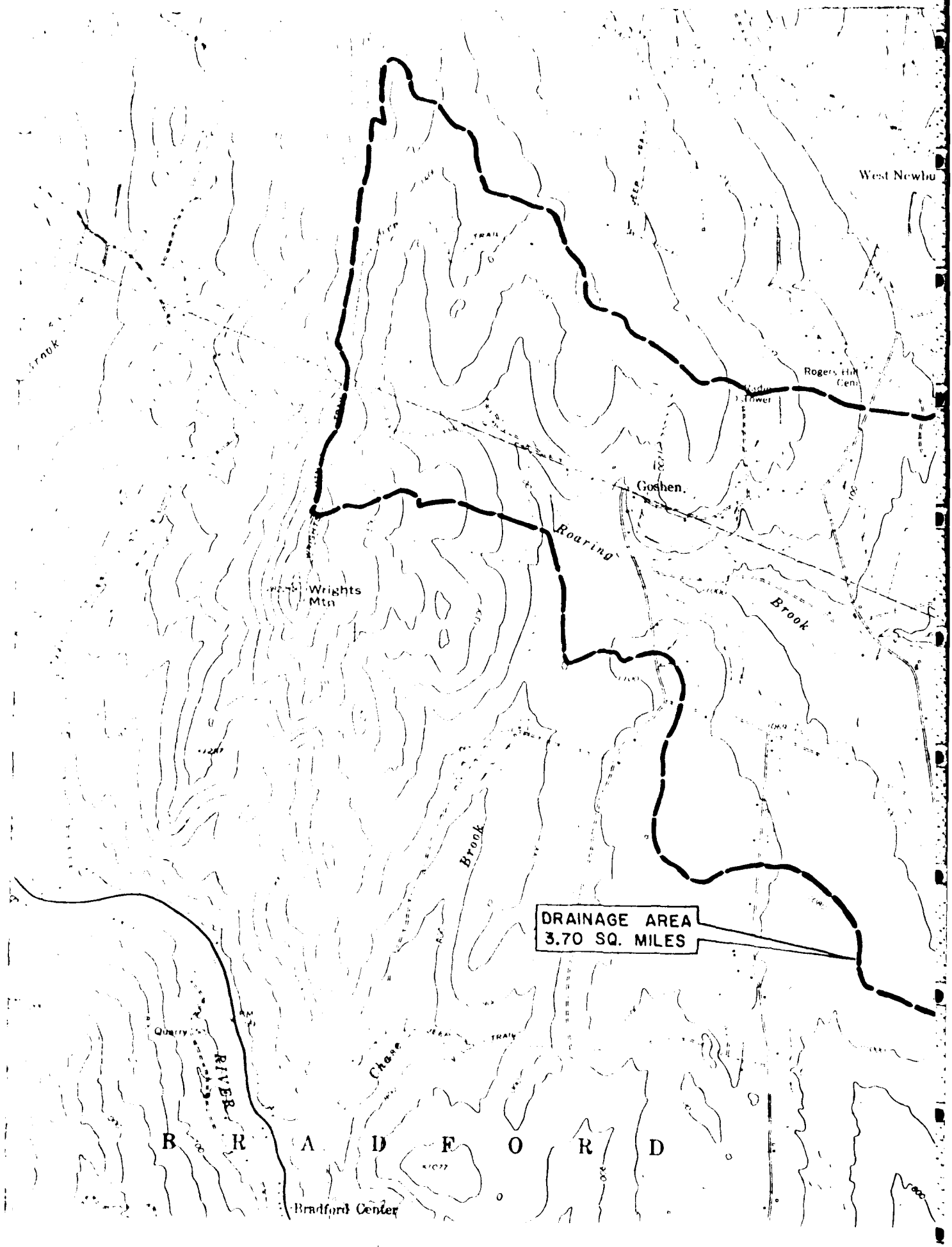
(16) Spillway Channel Downstream of Road Crossing.

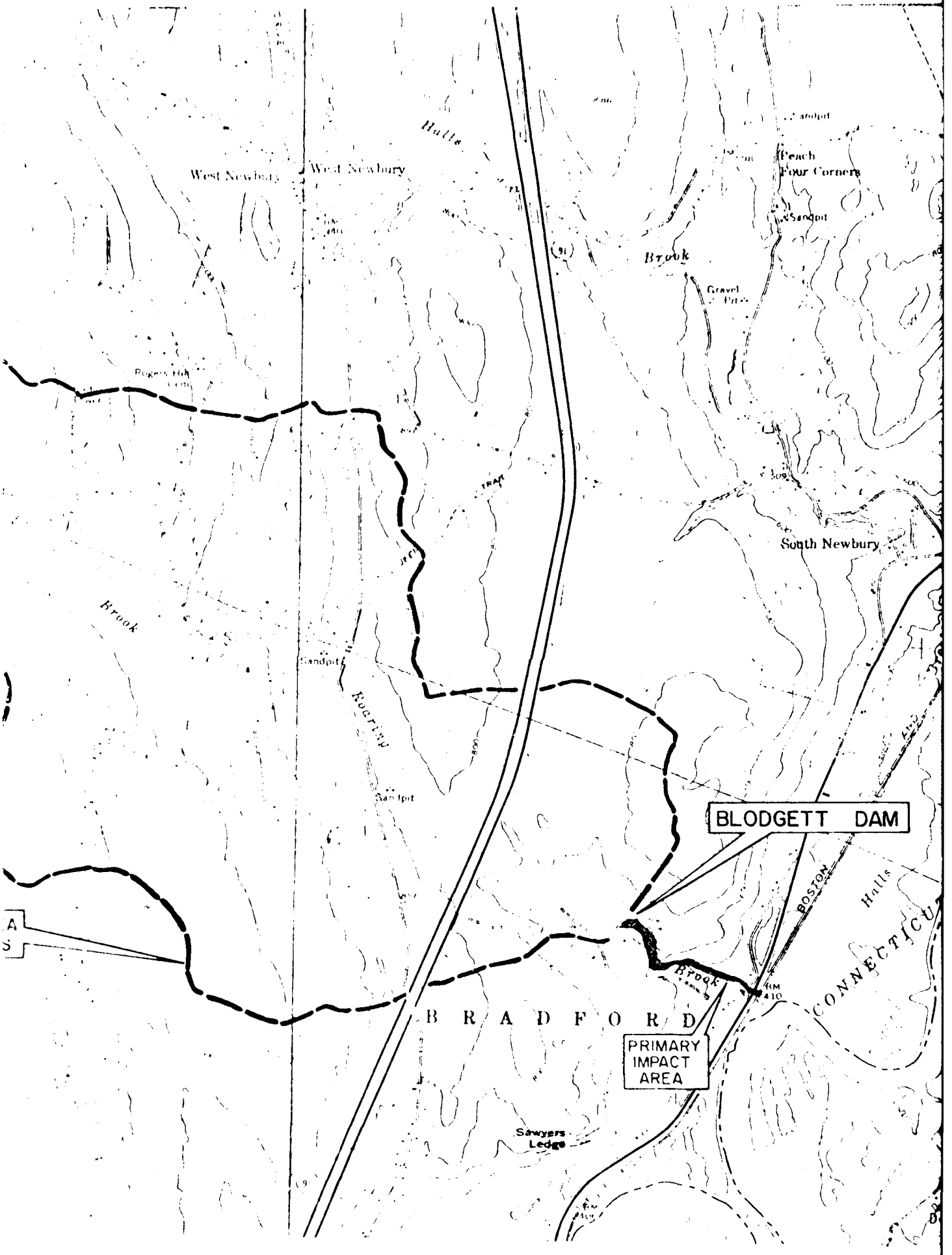
(17) Erosion of Right Side of Spillway Channel.

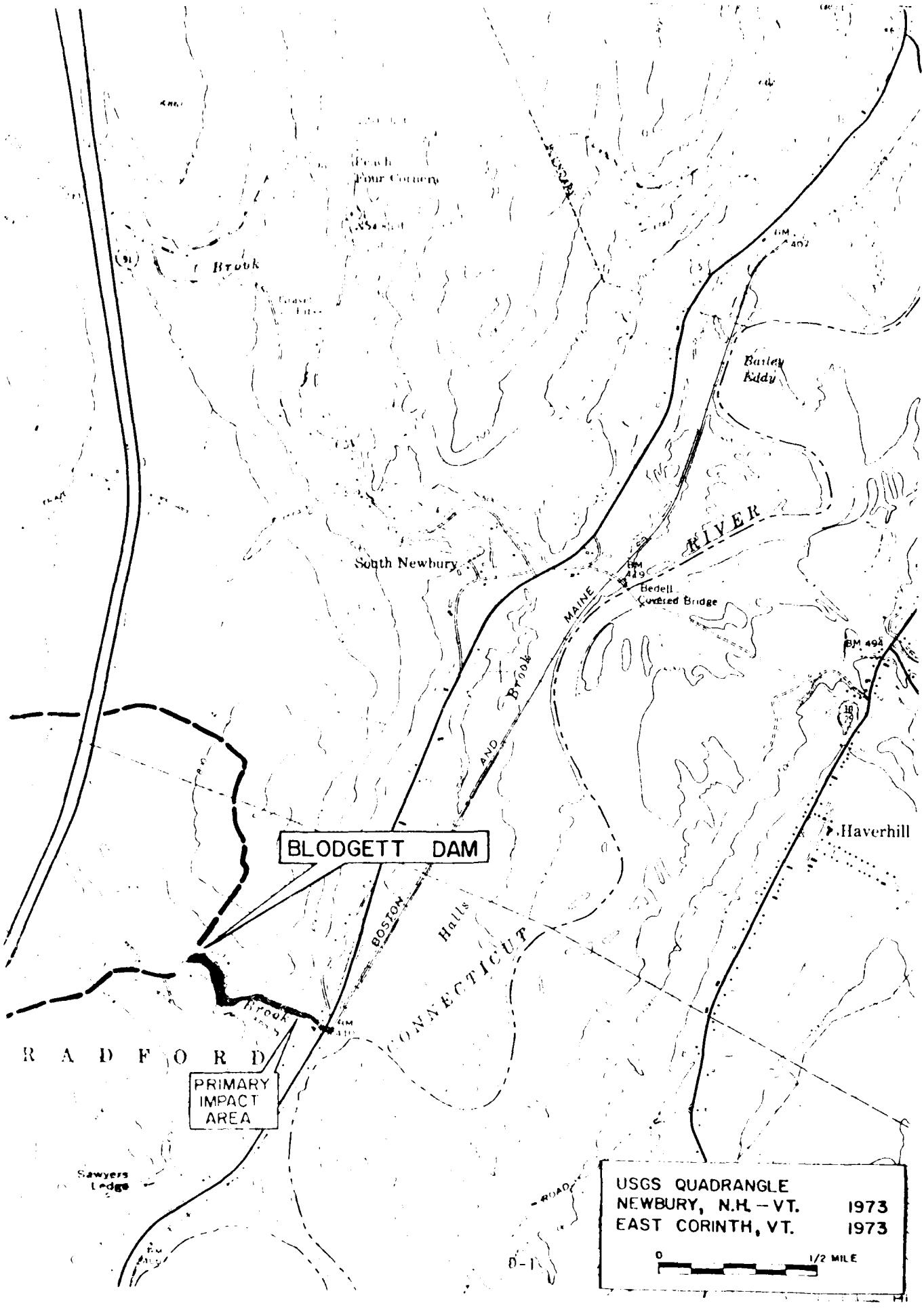
(18) November 4, 1927 Flood Level Marker (Disk) on Backwall of B & M Railroad Bridge Crossing Roaring Brook.

APPENDIX D

HYDRAULIC/HYDROLOGIC COMPUTATIONS


West Newbu
Rogers Hill
Goshen
Roaring
Brook
Wrights
Mtn
Brook
DRAINAGE AREA
3.70 SQ. MILES
Quarry
RIVER
Chase
TRAIL
B R A D F O R D
Bradford Center


West Newbury
West Newbury
Peach
Four Corners
Brook
Gravel
South Newbury
Brook
Sandpit
Sandpit
BLODGETT DAM
PRIMARY
IMPACT
AREA
BRADFORD
Sawyers
Ledge
BOSTON
CONNECTICU
Halls
BROOK
KM
410


BLODGETT DAM
PRIMARY IMPACT AREA
South Newbury
Bedell Covered Bridge
Haverhill
Barley Eddy
MAINE AND BOSTON
CONNECTICUT
RIVER
Halls Brook
Sawyers Ledge
R A D F O R D
USGS QUADRANGLE
NEWBURY, N.H. – VT. 1973
EAST CORINTH, VT. 1973
0
1/2 MILE

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet _____ of _____

Subject _____

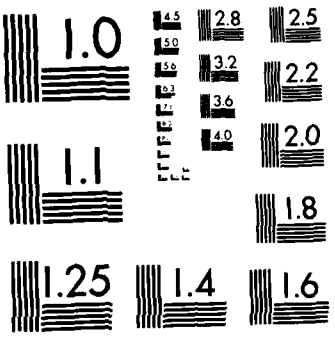
Computation _____ Job No. _____

Computed by _____ Checked by _____ Date _____

AD-A157 558 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 2/2
BLODGETT DAM (VT 0011... (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV OCT 80

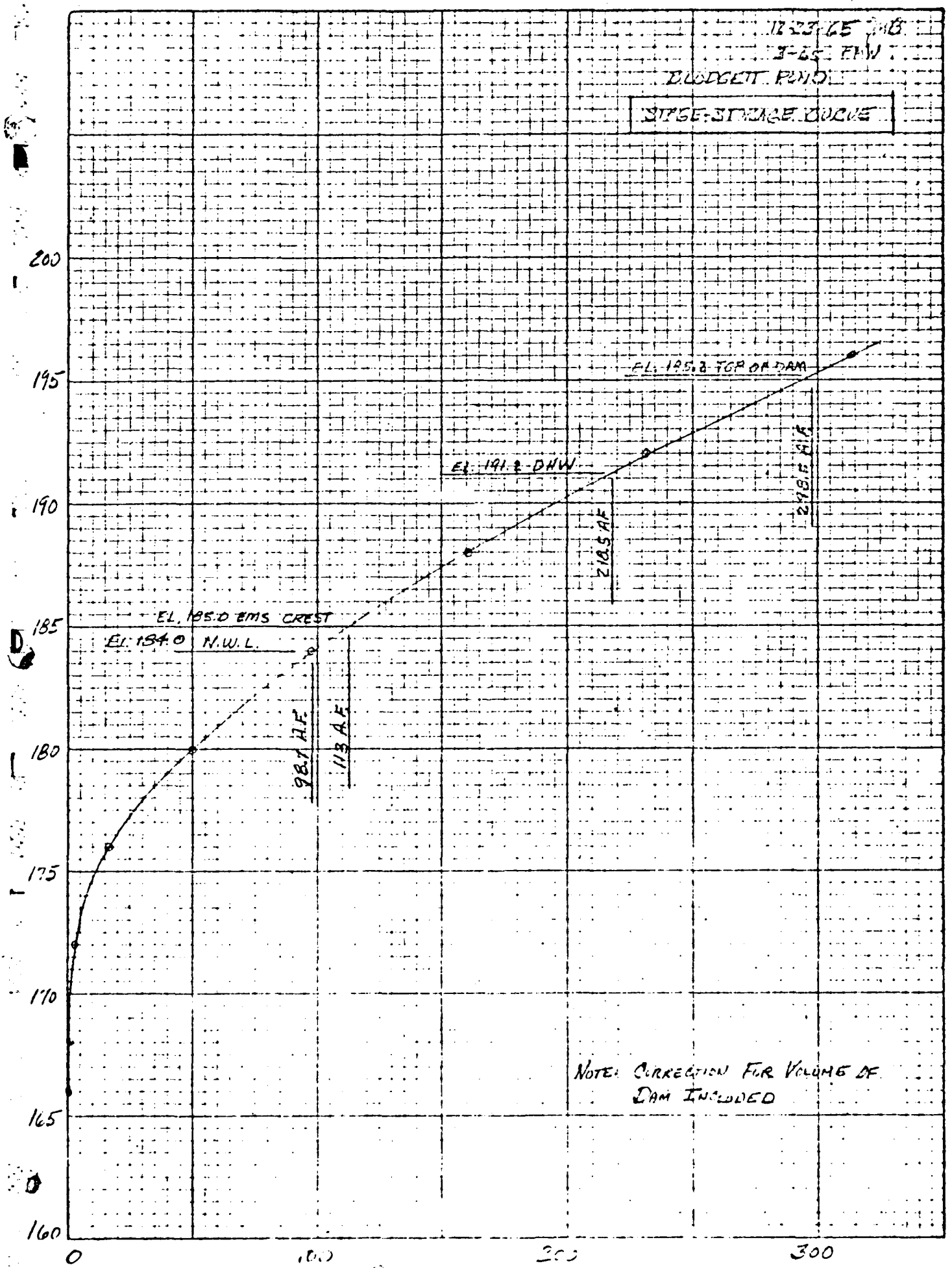
UNCLASSIFIED F/G 13/13 NL

END
FILMED
DTIC



MICROCOPY RESOLUTION TEST CHART

ARDS-1963-A


12-23-65 JHB
3-65 FHW
BUDGET RPD
STAGE-STORAGE CURVE
200
195
190
185
180
175
170
165
160
EL. 195.8 TOP OF DAM
EL. 191.2 - DHW
218.5 AF
298.6 AF
EL. 185.0 EMS CREST
EL. 184.0 N.W.L.
98.7 AF
113 AF
NOTE: CORRECTION FOR VOLUME OF DAM INCLUDED
0
100
200
300
STORAGE - ACRE FEET

Subject Inspection of non-federal dams

Computation Bladgett Dam Job No. 953-05L

Computed by DEF Checked by SDM/BW Date 8-29-79

ii) SIZE cont.

Storage cont.

Note that elevations used on the stage-storage curve are from the SCS Conversation Service Manual. Approximate equation is SCS + 960 = NGVD

Height = 29.1 feet - VI Dept of Water Resources Information Sheet

vi) Hazard Potential

Failure of dam during Normal flood flow 3400 feet U/S of the intersection of the Canaan and Maine R.R. tracks approximately 150 feet U/S of Route 61 Both these crossings would be overtopped causing severe damage. Failure of Dam A few feet could be lost of logs comp red = D/S of dam.

iii) Classification

SIZE : SMALL

HAZARD : SIGNIFICANT

b) Test Flood = 100 year flood ≈ 1/5 PMF = 1600 cfs

(used "Ratio of Peak Maximum 6-Hour Precipitation for 10 Square Miles to 100 Square Miles" given in the Act of Comm. Tech. Rec. Vol. 1, p. 58.

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet _____ of _____

Subject: Inspection of non-federal dams

Computation: [illegible] Dam

Job No. [illegible]

Computed by: [illegible]

Checked by: SDW/BW

Date: 8-2[illegible]-[illegible]

3) Surcharge at Peak Inflow

a) Peak Inflow

Test Flood = 1600 cfs = 100 yr. flood

b) Outflow Rating Curve

Primary Spillway el. 649 NGVD L=15' width = 7'

Q=CLH^3/2 c=2.85

* a 3 foot long section of this spillway has been severely damaged, no correction was made for this in the flow calculations

H	W.S. El	Q
1	645.0	43
2	[illegible].0	121
4	648.0	342
6	650.0	629
8	652.0	967
10	654.0	1352
11.[illegible]	[illegible]	160[illegible]

Emergency Spillway el. 645 NGVD L=65' width=7'

Q=CLH^3/2 c=2.[illegible]

H	Q	W.S. El
1	155	646.0
3	9[illegible]	619.0
[illegible]	2071	65[illegible]
7	[illegible]	652.0
9	[illegible]	654.0
10.8	[illegible]	[illegible]

Right Side of Emergency Spillway

[illegible] = 2H to 1V

Q=CLH^3/2 C=2.9

H		Q	
1		5	[illegible]
3		[illegible]	[illegible]
[illegible]		141	[illegible]
		[illegible]	

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Subject: Inspection of [illegible] Dam

Computation: [illegible] Job No. [illegible]

Computed by: [illegible] Checked by: SDM / BW Date: [illegible]

18" [illegible] pipe [illegible], c=120, [illegible] = [illegible], L = 200

$Q \cong 60$ cfs

Left Side of Emergency Spillway

Side Slope = 1.5 H to 1 V

$Q = CLH^{3/2}$ c = 2.5 stepped in 1 ft vertical increments

H ([illegible])	Q	WS El
1	4	646.0
3	31	648.0
5	106	650.0
7	230	652.0
9	416	654.0
10.2	561	655.2

The outflow rating curve is plotted on page 6

c) Spillway Capacity to Top of Dam

$Q_s \cong 8950$ cfs ws. El = 655.2

$Q_s \cong 559$ % of the Test Flood $Q_{p_1} = 1600$ cfs

d) Surcharge Height to Pass Q_{p_1}

Q_{p_1} @ 100 yr flood = 1600 cfs (see curve p. 6)

H = 648.3 − 644.0 = 4.3'

4) Effect of Surcharge on Max Probable Discharge

a) Pond Area – varies with surcharge (see curve p. 7)

(Curve [illegible] R.C. + D. [illegible] [illegible] [illegible], [illegible] on file [illegible] of [illegible])

b) [illegible] Normal Pool Level at [illegible] Crest [illegible] 644.0 NGVD

[illegible] = 3.1 mi² (see p. [illegible])

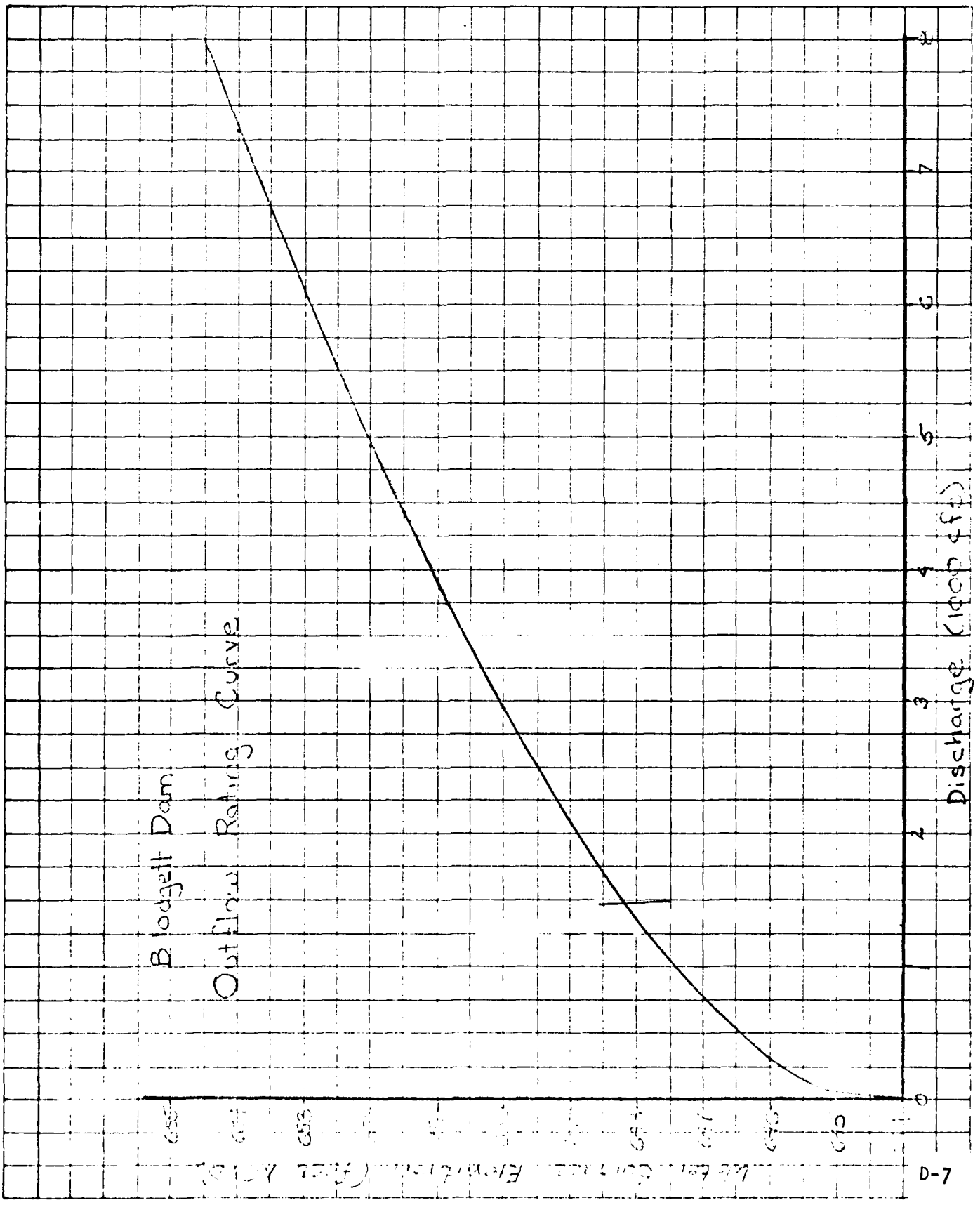
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

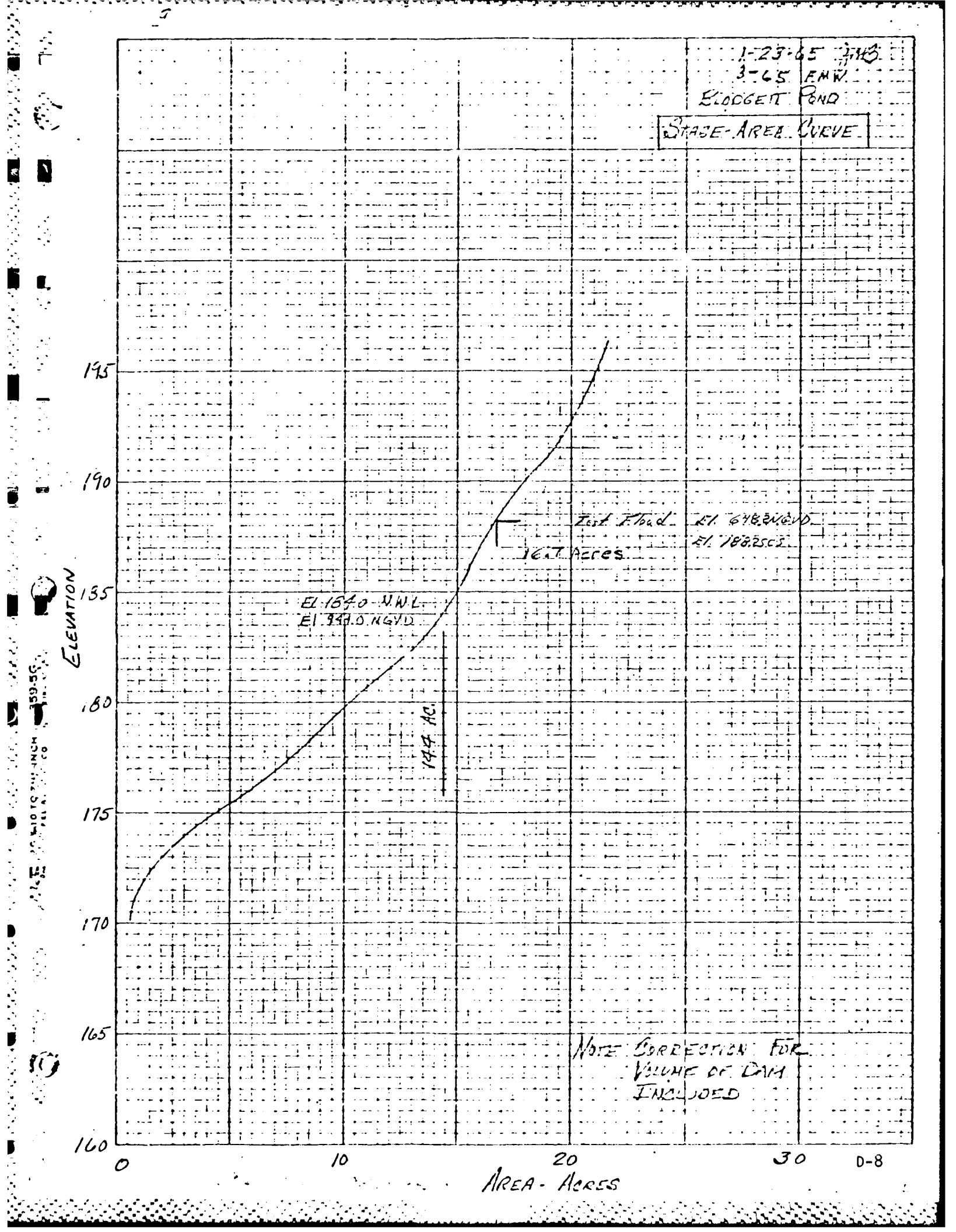
Sheet_____ of_____

Subject Inspection of non-federal dams

Computation Blodgett Dam Job No. 253-054

Computed by WCF Checked by SDM/BW Date 8-29-90




1-23-65 JHS
3-65 EMW
ELODGETT POND
STAGE-AREA CURVE
195
190
185
180
175
170
165
160
ELEVATION
El 1640 NWL
El 999.0 NGVD
144 AC.
Test Flood El. 648.2 NGVD
El. 1083.5 CE
16.7 Acres
NOTE CORRECTION FOR
VOLUME OF DAM
INCLUDED
0
10
20
30
AREA - ACRES
D-8

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet _____ of _____

Subject Inspection of Non-Power Dam

Computation Flashboard Dam Job No. 9[illegible]

Computed by RFP Checked by CDW/DAW Date 9-1-80

d) Discharge ($Q_{1/2}$) at Natural Surcharge Storage

H = 3.5' V = 152 − 98.7 = 53.3 Ac-ft (Curve Pg 2)

647.5 N.G.
187.5

$$S = \frac{53.3}{3.7 \times 43.2} = 0.27''$$

H = 4.5 V = 171.0 − 98.7 = 72.3 Ac-ft

642.5 N.G.
188.5

$$S = \frac{72.3}{3.7 \times 43.2} = 0.37''$$

From Approximate Storage Flow Relationship
(Q" = Inches of Surcharge Storage)
(100 yr. flood C_{max} = $C_{3.8}$)

H = 3.5 $Q_{3.5} = 1600 \left(1 - \frac{.27}{3.8}\right) = 1480$ cfs

H = 4.5 $Q_{4.5} = 1600 \left(1 - \frac{.37}{3.8}\right) = 1440$ cfs

e) Peak Outflow (Q_{peak})

Using Hydrologic Procedure "Surcharge Storage
Routing" Attached Plot
= 1470 cfs
H = 4.2'

f) Spillway Capacity to Overtop Dam

Spillway capacity to overtop Dam = 9[illegible]
Dam Crest Length = 109 ft

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet _____ of _____

Subject _____

Computation _____ Job No. _____

Computed by _____ Checked by SDM/DW Date 9-4-85

5) Summary

a) Peak Inflow

Q_{P_1} = 1600 cfs = Test Flood @ 100 yr flood

b) Peak Outflow

Q_{P_2} = 1470 cfs

c) Spillway Max Capacity

Q = 8750 cfs or 60% of Q_{P_2}

At Test Flood = 100 yr flood, the spillway handles the outflow utilizing ± 16% of its capacity with an average surcharge above the spillway crest of 4.2 ft or 6.8 feet below the top of the dam.

D-10

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ____ of ____

Subject: Inspection of non-federal dams

Computation: [illegible] Dam

Job No. 752-[illegible]

Computed by: [illegible]

Checked by: [illegible]

Date: 7-4-80

II Downstream Failure Hazard

1) Peak Failure Outflow

a) Breach Outflow

Mid-Height Elev ± 640.5 NGVD

Approx. Mid Height Length = 230' (from [illegible])

Breach Width (see NED-ACE D/S Dam Failure Guidelines)

$W_b = 0.4 \times 230 = 92$ feet

Height at time of failure $h_o = 29.4$ feet

Breach Outflow $= Q_b = \frac{8}{27} W_b \sqrt{g}\, h_o^{3/2}$

$W_b = 92$

$h_o = 29.4$

$g = 32.2$

$Q_b = 24,650$ cfs

b) Remaining Spillway Discharge

Since the breach is assumed to be in [illegible] with the spillway, the remaining spillway discharge [illegible] spillway capacity to the top of the dam.

$Q_s = $ [illegible]

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

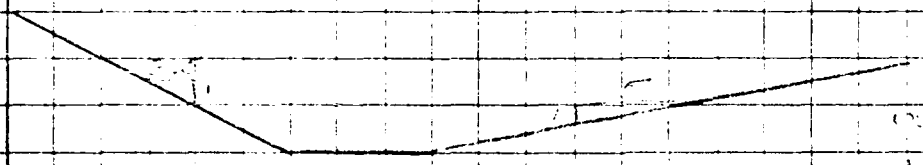
Sheet _____ of _____

Subject _____

Computation _____ Job No. _____

Computed by _____ Checked by _____ Date _____

Reach =1



JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
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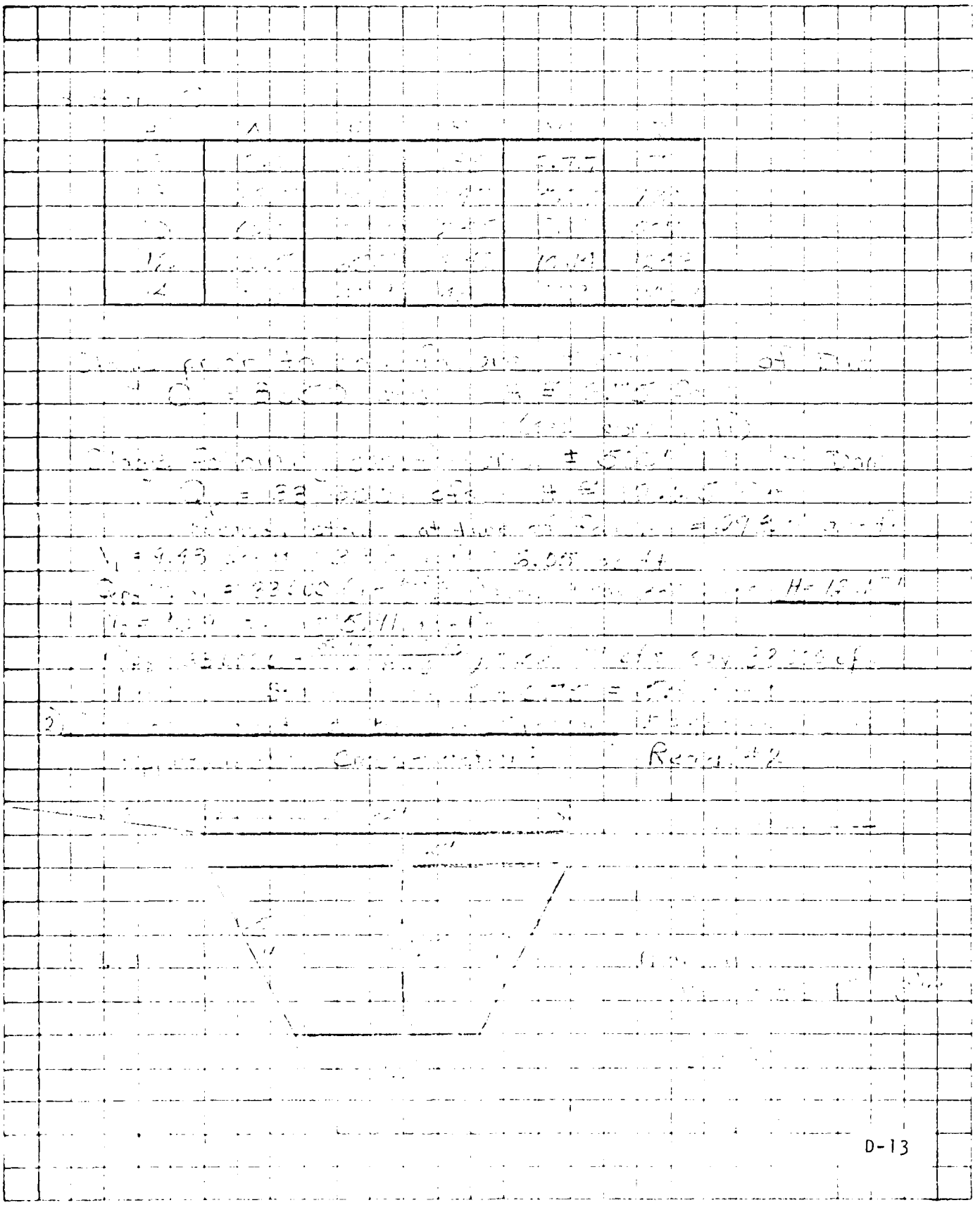
Computation _____ Job No. _____

Computed by _____ Checked by SDM Date _____



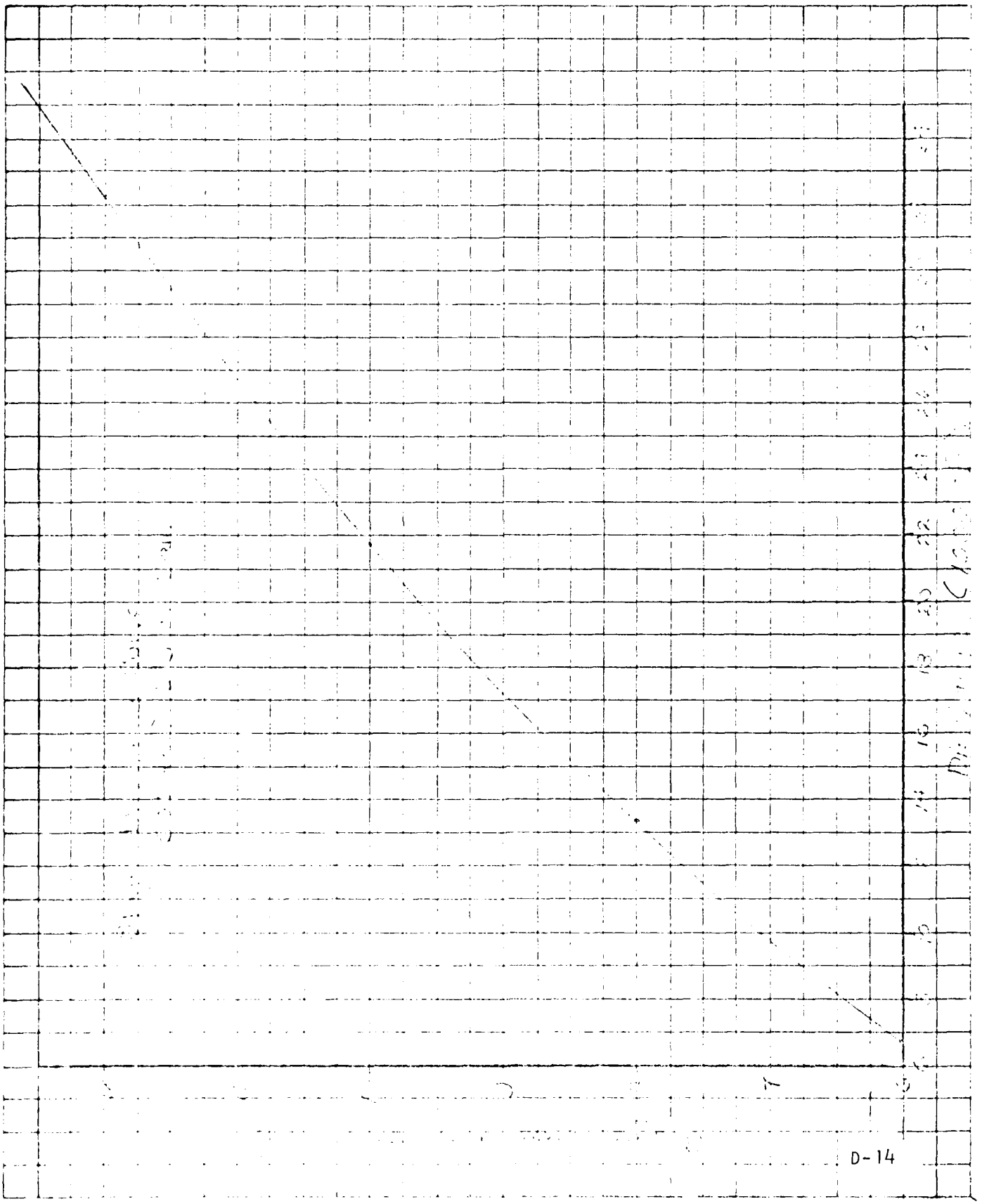
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet _____ of _____

Subject

Computation _____ Job No.

Computed by _____ Checked by _____ Date



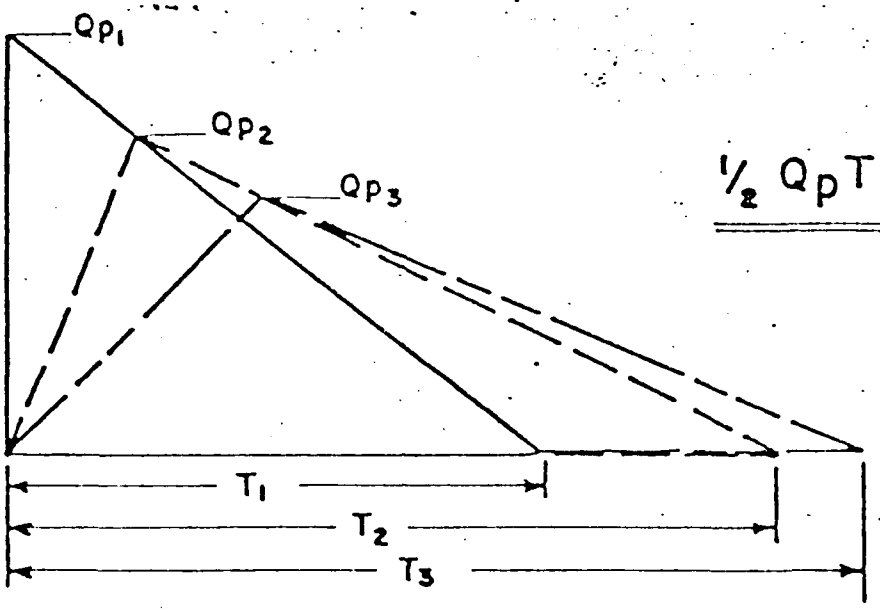
NOT AVAILABLE AT THIS TIME

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$\frac{1}{2} Q_p T = 12 S$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Q_{p1} = \frac{8}{27} W_b \sqrt{g} Y_o^{3/2}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Q_{p_2}(\text{TRIAL}) = Q_{p_1}\left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

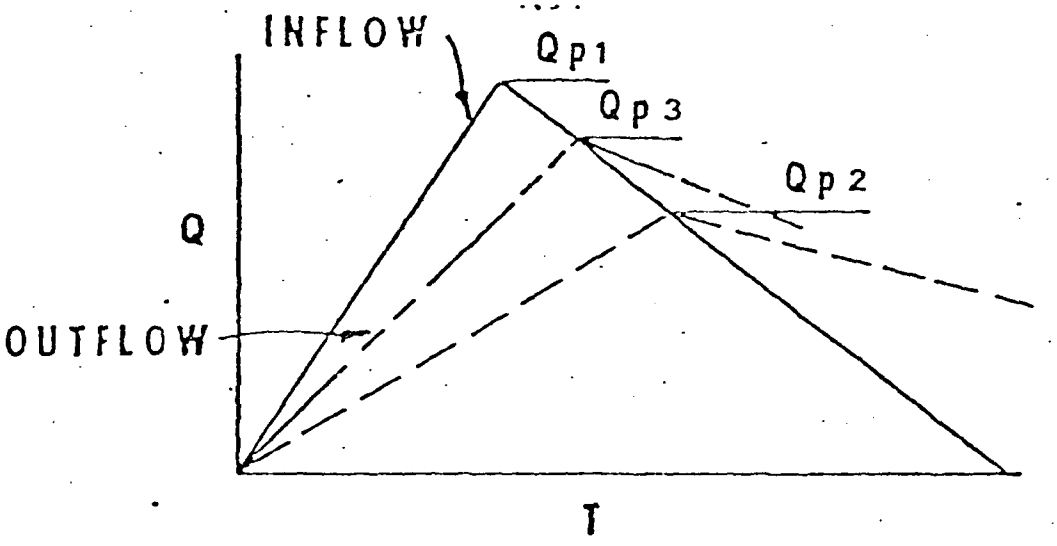
D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Q_{p_2} = Q_{p_1}\left(1 - \frac{V_{1+2}}{S}\right)$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



STEP 1: Determine Peak Inflow (Q_{p1}) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Q_{p1}".

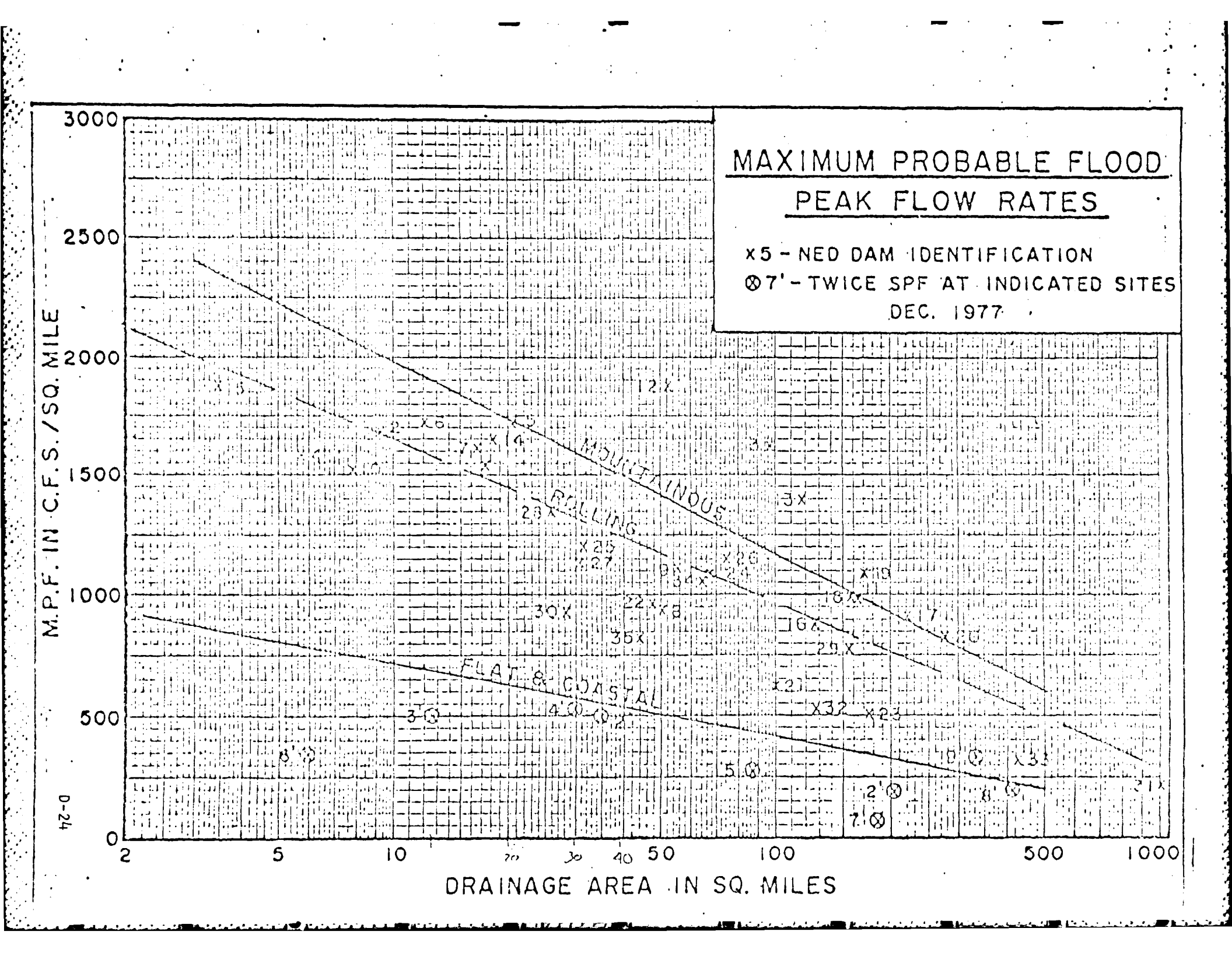
b. Determine Volume of Surcharge ($STOR_1$) In Inches of Runoff.

c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore:

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR_1}{19}\right)$$

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Q_{p2}"

b. Average "$STOR_1$" and "$STOR_2$" and Determine Average Surcharge and Resulting Peak Outflow "Q_{p3}".


MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
x5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITES
DEC. 1977
M.P.F. IN C.F.S./SQ. MILE
DRAINAGE AREA IN SQ. MILES
3000
2500
2000
1500
1000
500
0
2
5
10
20
30
40
50
100
500
1000
MOUNTAINOUS
ROLLING
FLAT & COASTAL
D-24

MAXIMUM PROBABLE FLOWS
BASED ON TWICE THE
STANDARD PROJECT FLOOD
(Flat and Coastal Areas)

River	SPF (cfs)	D.A. (sq. mi.)	MPF (cfs/sq. mi.)
1. Pawtuxet River	19,000	200	190
2. Mill River (R.I.)	8,500	34	500
3. Peters River (R.I.)	3,200	13	490
4. Kettle Brook	8,000	30	530
5. Sudbury River.	11,700	86	270
6. Indian Brook (Hopk.)	1,000	5.9	340
7. Charles River.	6,000	184	65
8. Blackstone River.	43,000	416	200
9. Quinebaug River	55,000	331	330

MAXIMUM PROBABLE FLOOD INFLOWS
NED RESERVOIRS

	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,600	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	MacDowell	36,300	44.0	825

PRELIMINARY GUIDANCE

FOR ESTIMATING

MAXIMUM PROBABLE DISCHARGES

IN

PHASE I DAM SAFETY

INVESTIGATIONS

New England Division
Corps of Engineers

March 1978

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ____ of ____

Subject [illegible]

Computation Blodgett [illegible]

Job No. [illegible]

Computed by [illegible]

Checked by [illegible]

Date 9-15-[illegible]

Summary

a) Peak Failure Out-flow Qp = [illegible] cfs

b) Rise in [illegible] ±500 ft D/S of [illegible] @ [illegible]

Pre-failure Stage = 6.75 feet [illegible]

Failure Stage = [illegible] feet

Rise in stage = [illegible] - 6.75 = [illegible] feet

c) Rise in Stage [illegible]

Pre-failure stage = 8.9 feet

Failure Stage = 19.3 feet

Rise in stage = 19.3 - 8.9 = 10.4 feet

U.S. [illegible] will be overtopped

by 3.3 feet [illegible]

d) Rise in Stage @ Railroad [illegible]

Pre-failure Stage = 11.75 feet

Failure Stage = 14.7 feet

Rise in stage = 14.7 - 11.75 = 2.95 feet

[illegible] R.R. [illegible]

will be overtopped [illegible]

[illegible]

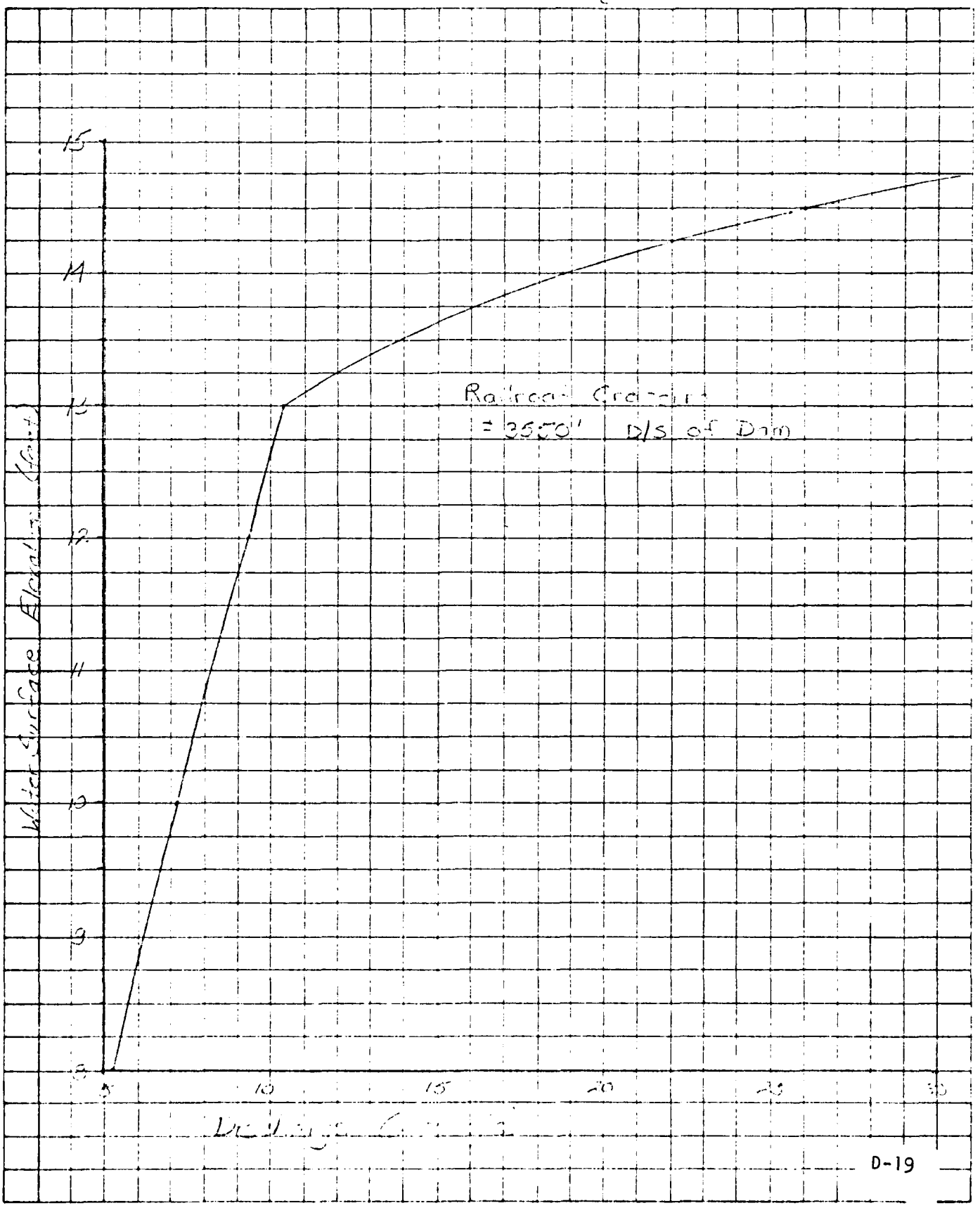
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____of_____

Subject_____

Computation_____ Job No._____

Computed by_____ Checked by_____ Date 9-15-80



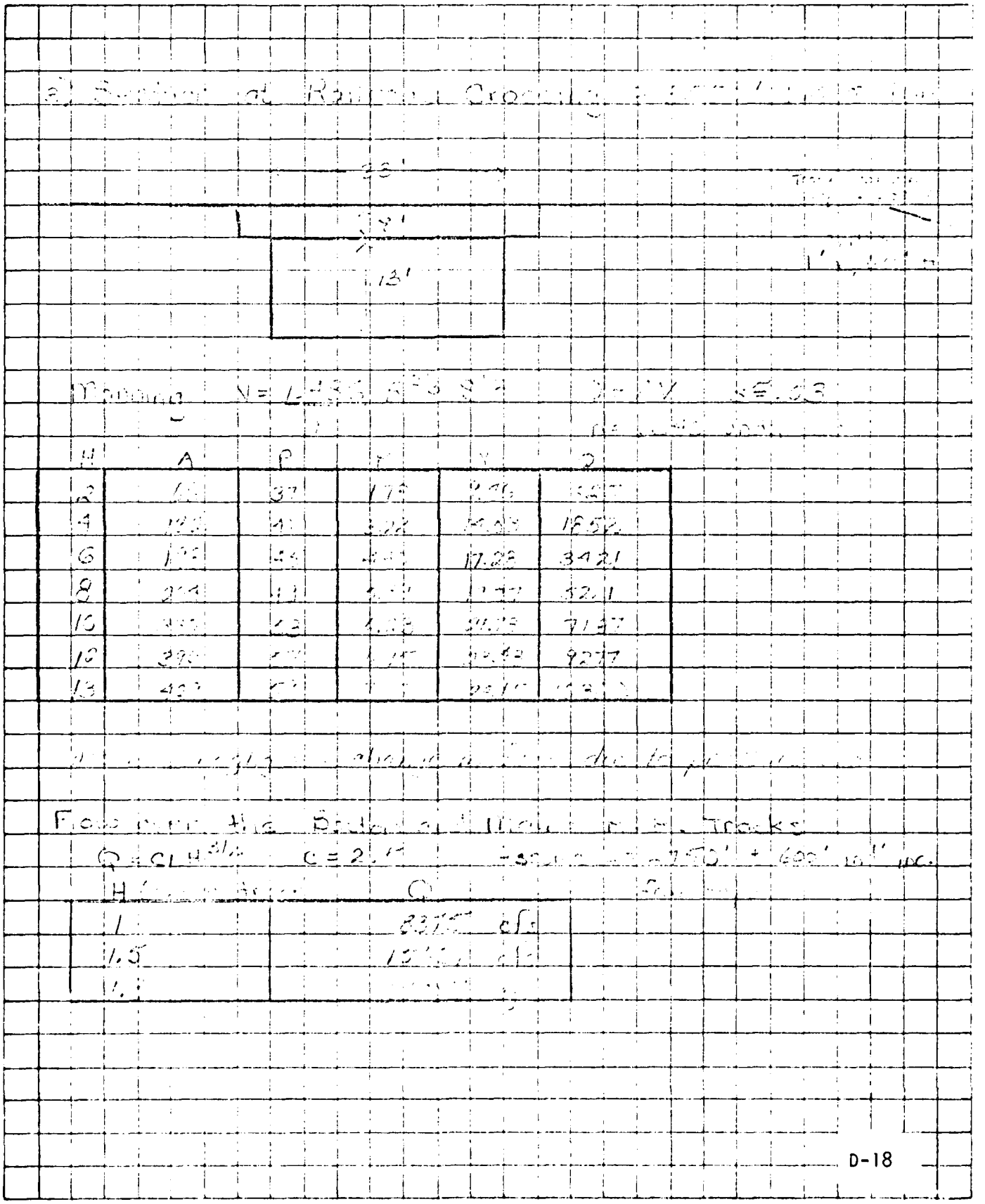
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet _____ of _____

Subject _____

Computation _____ Job No. _____

Computed by _____ Checked by _____ Date _____



H	A	P	R	Y	Q
2					
4					
6					
8					
10					
12					
13					

H	C
1	
1.5	

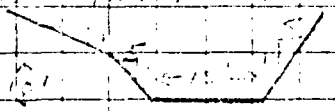
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____ of_____

Subject_____

Computation_____ Job No._____

Computed by_____ Checked by_____ Date_____



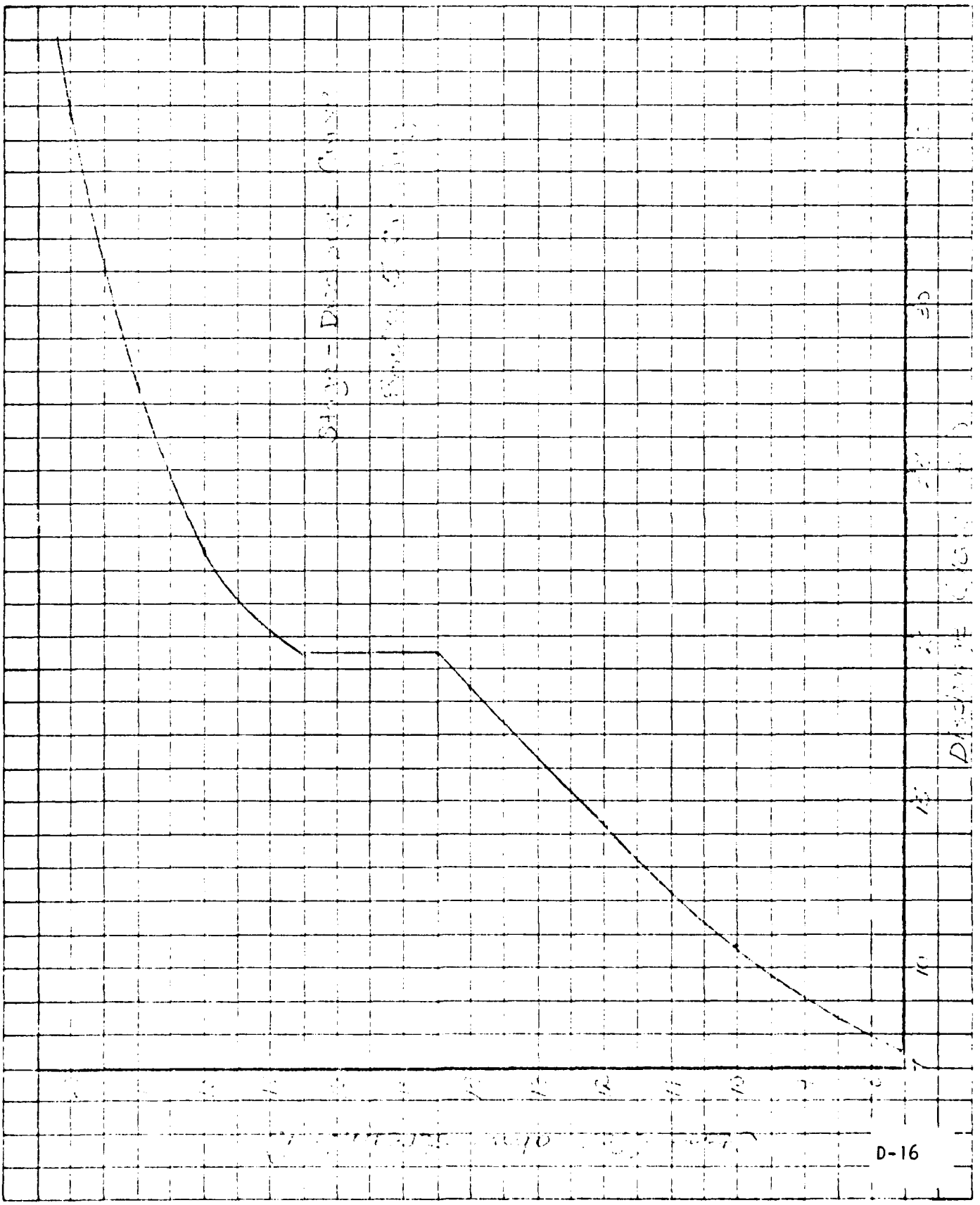
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet_____of_____

Subject_____

Computation_____Job No._____

Computed by_____Checked by_____Date_____



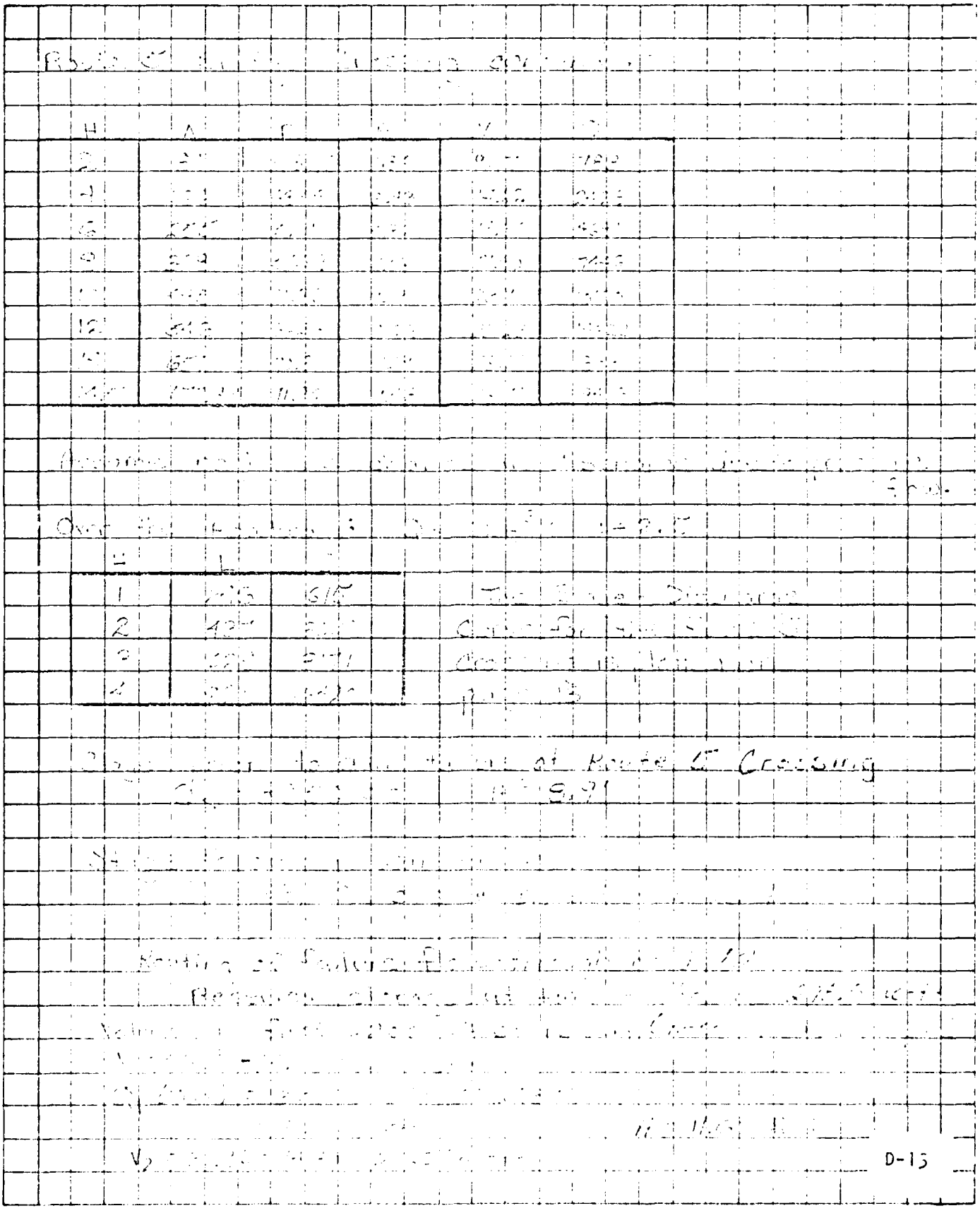
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet _____ of _____

Subject _____

Computation _____ Job No. _____

Computed by _____ Checked by _____ Date _____



END

FILMED

9-85

DTIC